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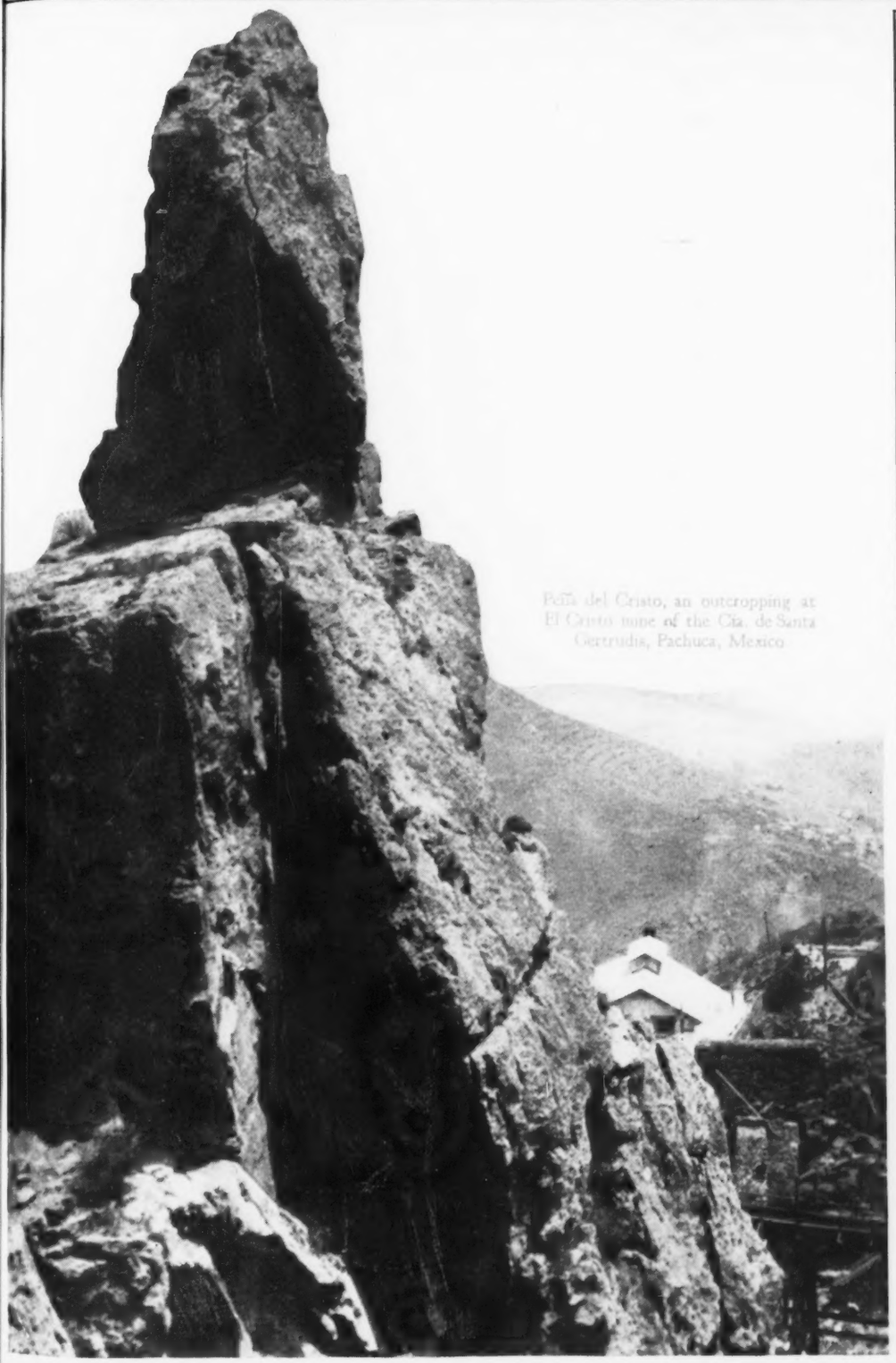

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ENGINEERING AND
MINING JOURNAL-PRESS

JOSIAH EDWARD SPURR, Editor

Volume 120 | New York, October 31, 1925 | *Number* 18

A Greater Kennecott

NEVADA CONSOLIDATED and Ray Consolidated in all probability will be merged as soon as formal authority is obtained from the respective stockholders. The directors and largest stockholders have agreed on the terms. The proposed transaction is for Nevada Consolidated to take over the mines and mills at Ray, Ariz., and at Chino, N. M., together with other assets, in exchange for new Nevada Consolidated shares that are to be issued. This is preferable to an exchange of stock, share for share, because there always are a few shareholders who decline to exchange in the hope of getting fancy prices for their holdings. The proposed arrangement permits the immediate combining of operating and corporate affairs, including accounting; makes Ray Consolidated a purely holding company; and paves the way for an early dissolution of the Ray corporation. The same procedure was followed in the Ray-Chino merger last year. The advantages of the consolidation, as pointed out by D. C. Jackling, president of Nevada Consolidated, include: strengthened financial status; smaller aggregate requirements for working capital; better position for marketing product; more effective utilization in operation of the highest executive and technical ability; and diversity of interest, whereby adverse conditions of weather, transportation, accident, labor and fuel supply, or other variables, which might temporarily disturb operations at one mine or group of mines, would not at the same time affect the others—all tending to reduce costs and promote greater and more uniform production and earnings.

The chief significance of the merger, however, lies in the establishment of direct ties between Kennecott and Ray and its adopted sister Chino. This pair has always been credited with being owned by the "public," as distinguished from companies like Nevada Consolidated and Inspiration, in which other copper companies or strong financial groups hold immense blocks of stock. It is generally agreed in Wall Street that a large block of about 500,000 shares was accumulated a year ago with the idea of effecting a merger between Ray and Inspiration. Inability of engineers even to approach an agreement as to the relative value of the two properties prevented the accomplishment of this plan. Now, interests in the Utah-Kennecott alliance are understood to have obtained sufficient holdings in Ray to assure the consummation of the present merger.

It is pointed out in Wall Street that Utah Copper owns only 51 per cent of Nevada's outstanding stock and that the dilution from 2,000,000 to 5,100,000—made necessary by the absorption of Ray—will cut Utah's holdings to only 20 per cent. As a matter of fact, Utah has been quietly buying Nevada shares in the open market, and now owns 61 per cent of the total, equivalent to 24 per cent following the merger. Doubtless this would be more than sufficient to insure dominance in the management of the company; but it is safe to assume that the accumulation of Ray stock, effected after the Inspiration idea fell through, will operate to increase the effectiveness of Utah's control of Ray. That ownership of the preponderant number of shares ultimately will be acquired, with possible further consolidations, seems likely.

With the completion of the Ray-Nevada "Con" merger, the Kennecott group to all intents and purposes will include the following properties: Kennecott, Mother Lode, Braden, Utah, Nevada Consolidated, Ray, and Chino. The production of the group in 1924 was 648,620,000 lb. of copper, but the potential production probably is more than 800,000,000 lb. per year if all of the mines were worked at maximum capacity with present plant and equipment. This easily is the biggest copper-producing unit in history.

The Pay of Anthracite Miners

ACCORDING to signed statements which the Anthracite Operators Conference is putting out, the 1924 average earnings of 18,957 contract miners was $2,437.70, and to earn this the miners worked less than 6¾ hours per day. Men paid by the day in 1924 averaged $1,717. There were 921 men who worked 275 days and received $3,947 each, or $14.33 a day, this being the highest average of fifteen averages published; these averages gradually sink to the lowest class, in which 1,439 men worked 261 days and received $2,151 each, or $8.25 a day. The operators state that the men who earned less worked only four or five days a week, "due to failure to take advantage of their opportunities."

The miners are now on strike, asking an increase of $1 a day for the day men and 10 per cent increase for the contract miners. The operators inquire of the public at large, "Are anthracite miners underpaid?" It's up to the public to decide and reply, for the public will pay the rate increase if it is granted. Each individual of the public—each reader of this article—will decide the question at once in his own way and according to his own lights. Many will consider somewhat enviously the pay of nearly 19,000 contract miners who averaged over $2,400 in a year for an average day's work of 6¾ hours. There will be many a white-collar man in the cities who will read this, and wish he could take off his collar, already perhaps a little grimy, and tackle the coal mines with their shorter hours and better pay. Let us quote again, for example, the extract from a government circular advertisement, which we have already quoted in our issue of Feb. 23, 1924:

> "Vacancies at the Naval Experiment Station, Annapolis, Md., at $4.56 per diem for laboratorian (mechanical), and $4.32 per diem for laboratorian (metallurgical), and vacancies in positions requiring similar qualifications, at these or higher or lower salaries, will be filled from these examinations, unless it is found in the interest of the service to fill any vacancy by reinstatement, transfer, or promotion."

Many a metal miner will entirely fail to sympathize with the wail of his dustier and less intelligent brother; but if reports are correct the coal miners have indeed,

on the average, enough intelligence to know that they are pretty well off, and if they strike it is because their general has ordered it. Concerning their own ideas as to when they have enough,—has anybody enough? Do you not consider yourself underpaid, dear reader? Is not someone whom you know, inferior to yourself, earning bigger pay? Therefore, why be wroth with the coal miner? The philanthropic reader will and does wish him and all others all the pay and profits they can get. But somewhere a balance must be struck—an economic balance. The philanthropic reader will perhaps dig down, if the strike succeeds, and pay a dollar a ton more for his coal,—for he must pay the increase, not the operator; but he will also be busy with schemes to avoid buying anthracite the next time, so that in the end the anthracite mines must compete in order to survive, and operators and miners alike must adjust their income so as to compete with the producers of other sources of heat and power.

The Mute, Inglorious Greelys

A WELL-ORGANIZED EXPEDITION into unknown lands, carried out according to schedule and returned in safety by competent leaders, attracts no popular attention. It is the scatter-brained plan, unskilled preparations, the failure and the disaster, which win from the newspapers and their subway readers the plaudits reserved for heroism. The art of advertising is all that its exponents claim it to be; it is an art which utterly escapes the grasp of the engineer.

The expeditions of the U. S. Geological Survey and the Canadian Geological Survey, carried on for many years, have explored and mapped a territory larger than the United States, much of it uninhabited to the present day, and much of it arctic. The people of Alaska should erect in some appropriate place, such as Juneau, an impressive monument to the men of the U. S. Geological Survey, who have been the advance guard of pioneering in their country.

Last summer a Geological Survey party spent seven months on the arctic slope of Alaska, during five months of which they saw no human being outside their own party and were entirely without communication with the outside world. Doing what? Reading, trying to keep life in them by hunting, telling each other stories to keep up their spirits? Nothing so hackneyed. They were making a reconnaissance, topographic and geologic survey of the basin of the Upper Colville River, a great river which flows into the Arctic, and they went in at the request of the Navy Department, for this unknown region constitutes "Naval Petroleum Reserve No. 4." There is no doubt, apparently, of its being reserved.

During the seven months, 7,000 square miles of territory was explored and mapped; the greater part of this had never been seen by a white man.

Leaving Nenana, the terminus of the Alaska Railroad, on March 12, the party traveled more than a thousand miles by dog sled to the scene of their labors, using two dog teams of eleven dogs each. At least one man ran behind each sled the whole distance to guide it. After 700 miles of this traveling (averaging 27 miles a day), they came to Kotzebue, a roadhouse and settlement on the Arctic coast. Beyond this they passed through Eskimo villages, but finally left even these, although they obtained additional dog teams to help freight their season's supplies and canoes to the upper reaches of the Colville basin which they intended to explore. The Colville is indicated tentatively by dots on existing published atlases. On May 30 the rivers were sufficiently thawed for them to launch their canoes and float rapidly down on uncharted and unknown waters. On July 13 the party began the ascent of the swift Etivluk River, a large tributary of the Colville, pulling the canoes up the stream by ropes, and making as a maximum record ten miles in one day. For fifteen days the entire party had to wade above their waists in swift ice water many times a day.

Finally, to cut the sketch short, the party are quietly back in Washington, with maps and geological observations, for the use of the Geological Survey and the Navy Department, and for the people for all time to come. The only accident was the loss of a finger—a quite unusual degree of miscalculation in a Geological Survey party. They did not starve or send out messengers; no relief expeditions were organized, no newspaper prominence was attained. They were sent to do the job, and they came back and reported it done; and are ready for the next assignment.

The topographer and geologist of the expedition were Gerald Fitz Gerald and Walter R. Smith; the two helpers Faye Delezene and Walter R. Blankenship. The excessive instinct for retiring from public notice of the geologist finds a final expression in his choice of a name, which virtually amounts to an incognito. This is a quite different man from the Smith (Philip S. Smith) who made such a splendid arctic trip last year for the Geological Survey; and so far as we know has no connection with any other Smiths, including the director of the Survey (George Otis Smith), who is understood to disclaim all charges of nepotism in stocking the Geological Survey.

No Gold From Mercury

SOME TIME AGO *Engineering and Mining Journal-Press* duly chronicled the claim of Dr. Adolph Miethe, of Germany, that he had transmuted mercury into gold, and the rival claims reported to have been made by a Japanese scientist that he had done the same thing and done it first. While we, like all the world, recognized that individuality of an element is no longer secure, since various elements have been shown to change into others, and therefore that transmutation of cheaper metals into gold was a possibility, yet we pointed out editorially the unlikelihood that Dr. Miethe had accomplished what he claimed; and further suggested that Dr. Miethe had committed the amateurish error of not testing his raw material and determining whether gold were not present in the mercury in the beginning. In our editorial of Nov. 8 we observed that "mercury almost invariably contains a small impurity of gold, the proportion of which coincides in a general way with the amount of gold held to have been formed by transmutation by the scientists in Berlin and in Tokio."

The *Scientific American* has had Dr. Miethe's tests repeated by competent scientists, and it has just given out the results, which are negative. It finds that the method does not change the mercury into gold. The Spanish mercury used by Dr. Miethe, it states, contains a little gold; and this gold separated out during the

experiment. The observers state that the mercury that they used was California mercury and therefore free from gold, but our editorial of Aug. 16 shows that California mercury does, as a rule, contain gold, although the *Scientific American* workers did not find it in the material with which they worked. Their report closes with a sardonic seriousness: "Gold can be extracted from mercury, but mercury cannot be transmuted into gold."

President Calles' Surprising Move

SHORTLY BEFORE P. Elias Calles was inaugurated President of Mexico he took occasion, during a visit to New York, to declare his intention of encouraging foreign interests to participate in the development of the natural resources of Mexico. Presumably he recognized the fact that without capital from the outside the industries of his country could not expand and no real measure of prosperity for the Mexican people could be realized. It is, therefore, with no little surprise that American mining companies and others learn of a recent communication addressed by President Calles to the Mexican Congress in which he seems emphatically to reverse this position.

The celebrated Article 27 of the constitution adopted in 1917 provides in effect that "only Mexicans and Mexican corporations have the right to acquire the ownership of lands and water or to obtain concessions for the exploitation of mines, waters or of mineral fuels." It is further provided that, except in a "forbidden" zone comprising a strip 100 km. wide along the international borders and 50 km. along the coasts, foreigners or Mexican corporations in which foreigners own any portion of the stock *may* be granted such rights if they formally renounce or waive all protection of their own government in respect to their holdings in Mexico. The status of a Mexican corporation having foreign shareholders owning a minority of the stock seems to be more favorable than if the foreigners' shareholdings are in the majority; but the difference is not made clear. In the forbidden zone, foreigners, and corporations owned in any part by foreigners seem to have no rights of ownership under any circumstances.

In his recent communication to the Congress, President Calles submits a tentative bill, the purpose of which is to interpret the law more clearly and to make enforcement of it more certain. He seems to imply that there has been some evasion of the law by foreigners as well as laxity in enforcement by Mexican officials.

The proposed bill provides, among other things, that (a) foreigners who own property or shares in corporations that own property in the forbidden zone either shall dispose of such holdings or shall become Mexican citizens within three years; and (b) foreigners whose ownership, either personal or corporate, does not involve holdings within the forbidden zone shall, within six months, make the necessary manifestation before the Foreign Relations Department to waive recourse to, or protection from, their own government, so far as Mexican property is concerned.

If these provisions were to be carried into effect retroactively the property of foreigners, in effect, would be confiscated. For example, if American shareholders in the Cananea Copper Co. were obliged to sell their holdings, necessarily to Mexican citizens, the market would be so limited that the realization would be a small fraction of the true value. The same thing would appear to apply to the owners of shares in many of the oil companies. It scarcely seems conceivable that an attempt will be made to enforce these measures, at least with respect to property or concessions acquired prior to 1917. Irrespective of the legal technicalities, however, it is obvious that the new policy is antagonistic toward foreign capital.

No one can quarrel with Mexico if she see fit to exclude foreign enterprise. No one can blame Mexico for wanting to exploit her own natural resources to whatever extent she is able. But without capital, modern industry cannot grow; and Mexico has not the capital necessary to finance new development. The situation in mining demonstrates the point. When rich bonanzas dotted the country new enterprises paid their way and made fortunes for their owners. Today millions of dollars usually must be spent to purchase and install mining and ore-treating equipment before operations are really profitable. The most resourceful and experienced management is necessary to make things pay. As yet, Mexico is not in position either to finance or direct the adequate development of her country. If corporations controlled by foreigners are willing to undertake the work, to abide by the same laws that affect corporations with none but Mexican shareholders, and to pay taxes on the same basis as others, Mexico should welcome them.

Fixed Prices

MONOPOLISTIC CONTROL of industries is not without certain advantages, and among these is the maintenance of a fixed price. Some readers will argue that a fixed price is not an advantage, but in many respects at least it is. Most producers of raw material would rather have the assurance of a fixed price for their product than not, for one element of risk is thereby eliminated and they can plan their operations with just that much more assurance. Of course, it is understood that they are in favor of a fixed price only if it is sufficiently high to be profitable. Manufacturers of the raw materials, too, are well satisfied with closely regulated prices, for the same reasons. The public would probably prefer price variations, so that it can exercise its judgment in buying when it thinks things are cheap, or from sellers who are cutting under the market, though, as a matter of fact, the dear public is not so wise as it thinks it is, and people buy more goods when the price is high than when it is low.

The markets of two important metals are thus controlled, and it is interesting to observe that prices are held steady from month to month, regardless of economic conditions. The price of aluminum has been maintained at 27c. per lb. for over a year now, the Aluminum Company of America having monopolistic control of this market. The price of nickel has also been pegged for months at its present level, to which it rose after competition with the British America company was eliminated. Of course, the International shares the nickel business with the Mond company as a minority interest, but the two companies are cooperators rather than rivals.

Provided the prices represent fair profits to the producers, but little exception can be taken to such control. It is certainly to be preferred to the wild fluctuations exhibited by antimony and arsenic, to take two glaring examples.

Mining Engineers of Note

Robert Allen Kinzie

ROBERT ALLEN KINZIE

BORN IN BOSTON and with a father in the United States Army, Robert Allen Kenzie may be said to have started under favorable auspices and in an environment which engendered respect for discipline and which laid the foundation for executive ability. His father, General D. H. Kinzie, was transferred to the Presidio at San Francisco, and Kenzie started his high-school work at the San Francisco Boys' High School. The school at that time was one of the most successful of its kind and maintained high standards and excellent discipline. With one exception the teachers were men, and good teachers as well. Graduates from this school naturally pointed toward the University of California, and Kenzie joined his fellow graduates who were fortunate enough to have the chance, and matriculated in the university, being graduated in 1897 in electrical engineering. Subsequently he took post-graduate work in mining and metallurgy. Kenzie worked in the mines of the Mother Lode and in Placer County during his vacations. Before entering the university he worked in the Ontario mine at Park City, Utah. Thus, when he was graduated he had a background of mining experience. He added to this after leaving college by working in the mines of California, Idaho, and Arizona. As assistant to Ross E. Browne and later to F. W. Bradley, of San Francisco, he gained experience in mine examination work. Kenzie's first operating position was as general manager of the Jesus Maria Mines Co. at Parral, Chihuahua, Mexico. Here he studied different mining districts in Mexico and subsequently added to his knowledge of Mexican mines. In 1901 he was selected by F. W. Bradley as assistant general superintendent of the Alaska-Treadwell and affiliated companies. He was advanced to general superintendent of the companies in 1905 and retained this position until 1914, obtaining an important experience in large-scale mine operation. The Alaska-Treadwell group was one of the early low-grade gold properties which resorted to systematic mining and which achieved a noteworthy position for the excellence of its practice and its splendid financial record. When Kenzie left Alaska, he opened an office in San Francisco and engaged in consulting practice. His successful operating experience attracted clients and his practice widened, both with respect to variety and geographical field. He directed the operations of tungsten mines in Nevada and California and made many mine examinations. Among other positions which he holds is that of consulting engineer for the Engels Copper Mining Co. In this capacity he organized the operating personnel and extended the development of the mine. Eventually the company's plants were improved and working costs reduced. Kenzie is also managing engineer of the Mines del Tajo, Sinaloa, Mexico. He succeeded in bringing this property into an important producer. A few years ago Kenzie was retained by an old-established cement company operating a plant and quarries near San Francisco. His immediate work in this connection was to reorganize the quarry operations of the company. He introduced a novel adaptation of glory-hole mining, in which work he was successful in materially reducing operating costs. As a result of this success he was retained to reorganize the company's cement plant, upon which work he is now engaged.

Kinzie married Veronica Kennedy. Two boys and two girls constitute their family. One of the boys is studying mining engineering.

Selective Flotation at Timber Butte

Résumé of Results Secured in Efforts to Separate Zinc and Lead in Complex Ores

By Edward Hodges Robie
Assistant Editor

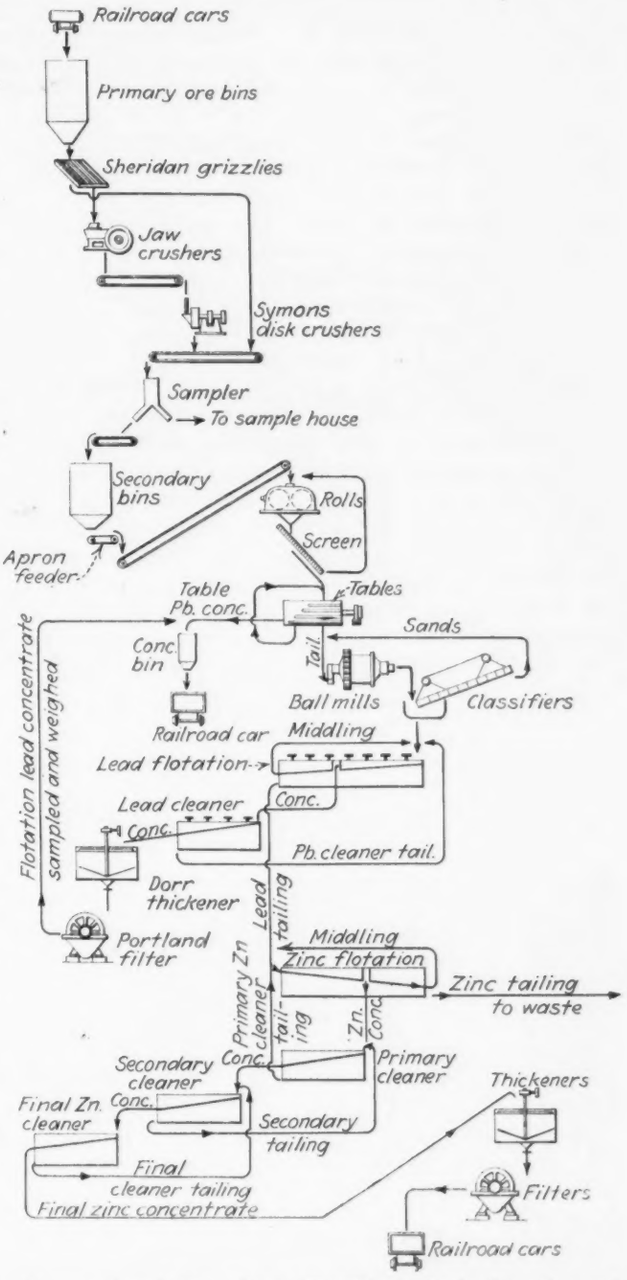
SELECTIVE FLOTATION was first applied at the Timber Butte concentrator for the treatment of the entire mill tonnage in 1919, after many months of laboratory work, since when a great deal of experimental work has been carried out, both in the laboratory and in the mill, on large tonnages of ores of varied character. In fact, the concentrating plant, though treating from 800 to 1,200 tons a day, has really been one large testing unit, and frequent changes in the flow sheet have been necessary to keep pace with the metallurgical developments in the treatment of widely different classes of ore, some of which have been quite refractory.

A capable and progressive operating staff has been developed under the direction of W. N. Rossberg, general manager of the Timber Butte Milling Co. and the Elm Orlu Mining Co. The names of G. A. Hellstrand, Guy E. Sheridan, George G. Griswold, Jr., and C. K. McArthur are well known through the patents that have been issued to them covering selective flotation. D. W. Buckby, the mill superintendent, T. C. Wilson, foreman, and other members of the staff have contributed materially in carrying out these metallurgical developments.

Most of the work that has been done at the Timber Butte mill has been of a pioneer nature and little has been published about it. Now, however, a background of several years' work has been built up, with much interesting data available in which other flotation operators will be interested. As the result of constant improvement, somewhat better results are now being obtained at the Timber Butte than are indicated in this article, which is of the nature of a review rather than entirely a comment on current practice.

Before considering any of the detailed results accomplished by selective flotation, brief mention will be made of the mill equipment and the conventional flow sheet. The photograph will give an excellent idea of the exterior of the mill building, which is situated on the side of Timber Butte about three miles south of the center of Butte, Mont. Silver-zinc-lead ores are received from the Clark properties, including the Elm Orlu, Moulton, Poser, and Eveline mines, and from various custom shippers. Small percentages of copper also add zest to the solution of the concentrating problem.

The ores are received over the standard-gage electrified railway of the company and connecting lines, in fifty-ton steel cars. Two Baldwin-Westinghouse locomotives are used, one of forty tons and the other sixty tons, the larger being shown in the photograph. The cars are dumped, after weighing, into concrete primary bins of 4,500 tons' capacity, these being divided into sections so that the various kinds of ore received may be kept separate. The construction of these bins was described by W. J. Tait in *Mining Journal-Press* of Sept. 29, 1923, page 549. From the bins the ore is received on Sheridan shaking grizzlies, as shown in the accompanying flow sheet, pieces larger than 1 in. being crushed in Blake jaw crushers set at 3 in., followed by horizontal Symons disk crushers giving a 1-in. product. Belt conveyors are used for transporting material between the various units, Dings magnetic separators and suspended magnets being installed at the head of all conveyors.



Conventional flow sheet, showing principal equipment and one method of treatment

One of the electric locomotives used for hauling ore cars and miscellaneous work

The ore, all crushed to 1 in., is combined with the grizzley undersize of the same maximum dimensions, sampled, and conveyed to the six secondary bins, four of steel and concrete and two of wood, the combined capacity of which is the same as the primary bins, 4,500 tons, giving a total bin capacity of 9,000 tons, which is necessary for the storage and separate treatment of ores of widely different characters. An automatic tripper is used on the belt over the bins. Automatic apron feeders remove the ore to belts, at the termini of which weighing devices provide a means of regulating the mill tonnage.

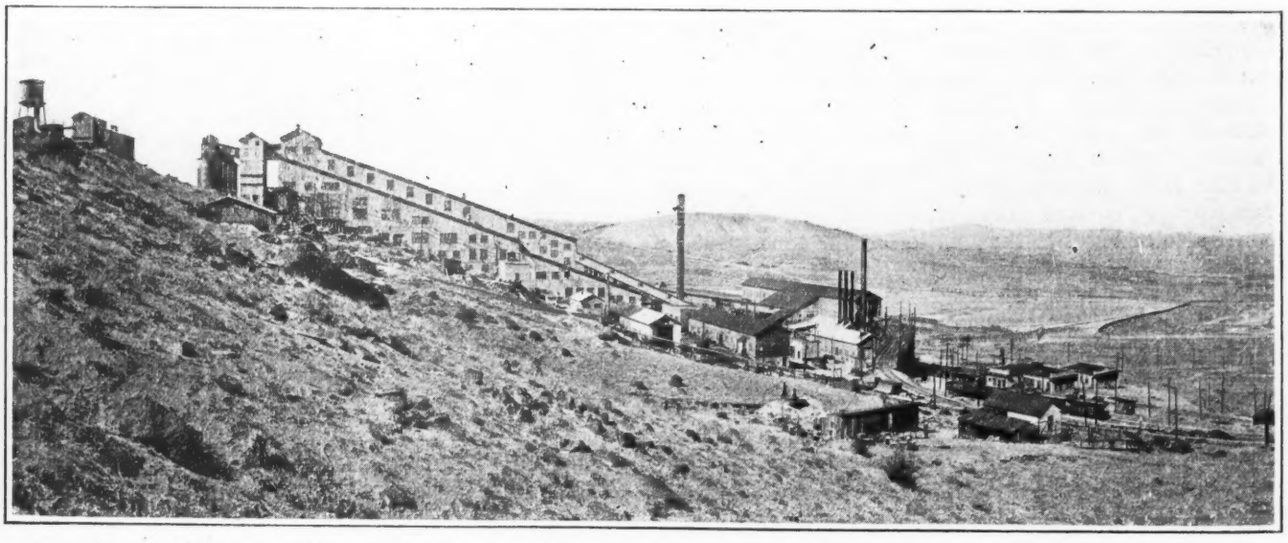
Garfield rolls make the severe reduction from 1 in. to $\frac{1}{8}$ in., working in closed circuit with Hum-mer screens. Water is first added underneath the rolls, which are choke-fed. The screen undersize is treated on Wilfley tables, making a finished lead concentrate and a tailing to be re-treated. A large circulating load of returned middling sulphides is maintained, to crowd back the gangue and produce a cleaner concentrate. The coarse lead concentrate is dewatered in bins and loaded in railway cars for shipment to the lead smelters, and may now be forgotten. The tailing is distributed to mechanical classifiers of the Dorr and Akins types, in closed circuit with Allis-Chalmers, Colorado Iron Works and Hardinge ball mills, the classifier overflow going direct to flotation. Overflows of varying degrees of fineness, usually from 60 to 100 mesh, are produced, according to the character of the ore. This fineness is regulated, while keeping the tonnage constant, by varying the ratio of circulating load to total load of the ball mills, by varying the number of classifiers employed, or by adjusting the density of the pulp. The density is known and constantly and automatically recorded by the use of recording density meters.

Differential Flotation for Zinc and Lead

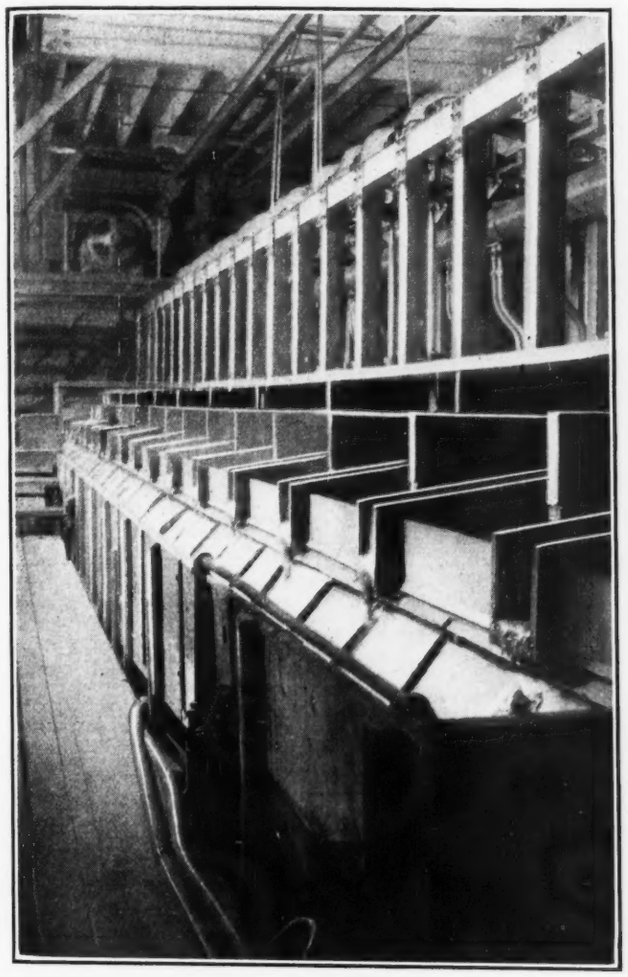
The flow sheet is decidedly flexible, and permits of many diversified treatments as a result of several years' treatment of different classes of ores, but it is thought best here for the sake of clearness to enumerate only the salient features. A division of the flow sheet into two sections can be made, the lead section and the zinc section. The classifier overflow goes direct to the lead roughers, which are Minerals Separation machines of modified construction as developed at Sunnyside, Colo., for the quick removal of the fragile froth produced on some ores. This froth is forced over a weir through a restricted opening, supplementary low-pressure air being used in some instances, the weir arrangement being such as to permit at all times a pulp circulation up to the maximum pumping capacity of the impeller blades. The accompanying photograph, taken from the head end of these machines, will give an idea of their appearance. Concentrate is cleaned in Callow pneumatic cells, shown in another photograph, making a final lead flotation concentrate which is thickened and filtered. Middling is returned, along with the cleaner tailing, to the rougher feed and the tailing goes to the zinc section.

The zinc roughers are standard Minerals Separation machines, the tailing from which goes to waste, the middling being returned to the feed, and the concentrate being given three successive cleanings in Callow cells, as shown in the flow sheet.

The overflow water from the lead thickener tanks is returned for use as launder water or tank sprays in the lead section; likewise, the zinc tanks' overflow is consumed in the zinc section. No intermixing of these return waters is permissible, as the chemicals and oils contained therein would interfere with flotation. Fresh water, of course, is also needed, so that three distinct water lines are in use. At all salient points of the flow are automatic sampling devices, so that metallurgical



A general view of the Timber Butte milling plant and offices



A remodeled Minerals Separation flotation machine, of the type developed at the Sunnyside Mill, in Colorado

sheets for each section of the mill may be balanced.

During the depression of 1921, when zinc and copper operations were largely suspended throughout the country, the Timber Butte mill was without a market for zinc concentrate and was therefore run on refractory silver ores containing only a small amount of zinc and lead from the upper levels of the Elm Orlu mines. This type of ore had formerly been sent to the copper smelters and was not considered to be milling ore, because some of the mineralization was the product of secondary enrichment and the silver was present largely as a fine amorphous mineral difficult to recover by flotation. Selective flotation was necessary for the milling of these ores, so that the silver and lead could be recovered separately from the zinc. The lead and silver products were shipped to lead smelters, and the zinc concentrate was stored for future shipment. Table I shows the results that were obtained in February, 1922, on this Elm Orlu silver-zinc ore.

The silver-lead concentrate was combined with the tailings from cleaning of the zinc concentrate, making a product to ship to the smelter assaying as follows:

	Per Cent				
Ag, Oz.	Cu	"Insol."	Fe	Za	Po
90.0	2.6	29.0	14.0	14.8	7.5

The results shown in Table I were obtained by the sodium sulphide process developed by G. A. Hellstrand. The lead-silver concentrate was obtained from the primary flotation machine without re-treatment. The zinc rougher concentrate which was produced subsequent to the lead flotation was re-treated by the addition of sulphuric acid, producing a finished zinc concentrate and a siliceous silver product as a tailing, the addition of acid in this treatment having the effect of dropping the refractory silver minerals. The reagents were as follows:

Lead Section

Sodium sulphide (52 per cent), lb. per ton	2.5	Added in grinding section
Barrett No. 4 oil, lb. per ton	0.25	Added in grinding section
Cresylic acid, lb. per ton	0.05	Added at machine

Zinc Section

Sodium carbonate, lb. per ton	2.0	Added to lead rougher tailing
Barrett No. 4 oil, lb. per ton	0.8	Added to lead rougher tailing
Steam-distilled pine oil, lb. per ton	0.15	Added to lead rougher tailing
Sulphuric acid (60 deg. Bé.), lb. per ton	2.0	Added in cleaner section

Grind: 5 per cent on 100 mesh. Density of flotation pulp: 80 per cent water. Temperature: 54 deg. F.

The sodium sulphide used in this work was the commercial article containing salt, sodium carbonate, and other impurities.

Ores from the Hibernia, Moulton, and other properties, high in iron and lead, have been treated by both the sodium sulphide and sodium cyanide methods of differential flotation. Results on these classes of ores by the sodium sulphide method were as follows:

Table II—Selective Flotation of Ores High in Iron and Lead by Sodium Sulphide Process

		Assays				Percentage			Recovery
Material	Weight	Ag, Oz.	Per Cent "Insol."	Per Cent Fe	Per Cent Zn	Per Cent Pb	Ag	Fe	Zn	Pb
Feed	....	8.7	...	4.0	11.2	7.6	....	....	....	....
Table Pb conc.	5.0	23.4	2.0	12.0	2.6	50.3	13.5	15.0	4.3	33.2
Flot. Ag-Pb conc.	8.0	53.0	5.0	13.7	12.0	43.5	48.7	27.5	8.6	45.8
Zinc conc.	16.0	13.0	3.5	2.4	56.1	6.9	23.9	9.5	80.2	14.4
Tailing	71.0	1.7	...	2.7	1.1	0.7	13.9	48.0	6.9	6.6
Total	100.0						100.0	100.0	100.0	100.0

Feed pulp: 5 per cent plus 100 mesh; 78 per cent water; temperature, 54 deg. F

Pounds Reagents Per Ton Ore

Lead Section

Sodium sulphide	6.4	Added in grinding section
Barrett No. 4 oil	0.21	Added in grinding section

Zinc Section

Sodium carbonate	1.8	Added to lead rougher tailing
Copper sulphate	0.85	Added to lead rougher tailing
Barrett No. 634 oil	1.2	Added to lead rougher tailing
Steam-distilled pine oil	0.15	Added to lead rougher tailing

Here, it will be noted, a small amount of copper sulphate was used to aid in floating the zinc, 80 per cent of which was recovered in a concentrate containing 7 per cent lead.

Various ores containing a large proportion of lead and iron are treated by the sodium cyanide process developed by Sheridan and Griswold. The results shown in Table III are the average for August, 1924, with the cyanide process.

Table I—Selective Flotation Using Sodium Sulphide

			Assays, Percentage					Recovery, Percentage				
Material	Weight	Ag, Oz.	Cu	"Insol."	Fe	Zn	Pb	Ag	Cu	Fe	Zn	Pb
Feed	100.0	11.4	0.3	67.1	1.75	4.8	0.8	....	....	....	....	....
Silver-lead concentrate	6.4	110.0	3.6	15.5	18.0	18.0	10.5	61.7	76.4	65.7	23.9	83.8
Zinc concentrate	5.0	35.0	0.55	5.4	2.4	56.8	1.3	15.4	9.3	6.9	59.2	8.1
Tailing from zinc	2.8	44.3	0.4	60.0	5.0	7.5	0.7	10.9	3.3	8.0	4.4	2.5
Mill tailing	85.8	1.6	0.04	....	0.4	0.7	0.05	12.0	11.0	19.4	12.5	5.6
Total	100.0							100.0	100.0	100.0	100.0	100.0

Table III—Selective Flotation With Cyanide, on Moulton and Miscellaneous Ores

Material	Weight	Assays: Ag, Oz.	Per Cent "Insol."	Per Cent Fe	Per Cent Zn	Per Cent Pb	Percentage: Ag	Fe	Recovery: Zn	Pb
Feed	....	8.2	53.0	7.0	10.6	4.8	....	....	....	....
Table Pb conc.	1.8	33.0	1.4	22.3	6.4	37.5	7.2	5.7	1.1	14.2
Flot. Ag-Pb conc.	6.4	68.7	2.8	6.0	15.1	52.0	53.7	5.4	9.2	69.4
Flot. zinc conc.	16.3	10.4	4.2	5.0	55.1	3.0	20.7	11.7	84.7	10.2
Tailing	75.5	2.0	....	7.2	0.7	0.4	18.4	77.2	5.0	6.2
Total	100.0						100.0	100.0	100.0	100.0

Feed pulp: 6 per cent plus 100 mesh; 80 per cent water; temperature, 60 deg. F.

Pounds Reagents Per Ton Ore

Lead Section

Sodium bicarbonate	3.0
Zinc sulphate	0.5
Sodium cyanide	0.3
Barrett No. 4 oil	0.2
Steam-distilled pine oil	0.05

Added to grinding section; Added at head of lead machines

Zinc Section

Caustic soda	1.0
Copper sulphate	1.0
Barrett No. 634 oil	1.1
Steam-distilled pine oil	0.1

Added to tailing from lead machines

Zinc ores from the Elm Orlu mine, containing only a small amount of lead and iron, have been treated by both the sodium sulphide and sodium cyanide methods. The results given in Table IV for sodium sulphide represent the practice during July, 1923, with alkaline treatment for the lead, and acid flotation for the zinc, whereas the cyanide data cover the practice in September, 1924, with alkaline flotation for both lead and zinc.

Table IV—Selective Flotation with Sodium Sulphide on Elm Orlu Ore

Material	Weight	Assays: Ag, Oz.	Per Cent "Insol."	Per Cent Fe	Per Cent Zn	Per Cent Pb	Percentage: Ag	Fe	Recovery: Zn	Pb
Feed	....	4.8	...	1.8	14.0	1.0	....	....	....	....
Ag-Pb conc.	4.7	34.5	6.9	24.9	13.5	13.2	33.7	65.0	4.5	62.0
Zinc conc.	21.5	13.25	3.4	1.7	59.1	1.44	59.4	20.6	90.8	31.0
Tailing	73.8	0.45	...	0.35	0.9	0.1	6.9	14.4	4.7	7.0
Total	100.0						100.0	100.0	100.0	100.0

Feed pulp: 2 per cent on 65 mesh; 80 per cent water; temperature, 54 deg. F. in lead section and 100 deg. in zinc section.

Pounds Reagents Per Ton Ore

Lead Section

Sodium sulphide	5.7
Barrett No. 4 oil	0.25
Steam-distilled pine oil	0.08

Added in grinding section; Added at machine

Zinc Section

Sulphuric acid	40.0
Barrett No. 4 oil	0.65
Steam-distilled pine oil	0.80

Added to lead rougher tailing

The results shown in the following Table V were based on only a few days' operation. Alkaline flotation of the zinc would undoubtedly have given as good results as the acid circuit, in the zinc section.

Table V—Selective Flotation with Sodium Cyanide on Elm Orlu Zinc Ore, in September, 1924

Material	Weight	Assays: Ag, Oz.	Per Cent "Insol."	Per Cent Fe	Per Cent Zn	Per Cent Pb	Percentage: Ag	Fe	Recovery: Zn	Pb
Feed	....	4.5	...	2.3	11.6	1.7	....	....	....	....
Table Pb.	0.4	15.0	2.8	19.7	10.1	36.0	1.3	3.5	0.3	8.8
Flot. Ag-Pb, conc.	1.7	38.6	2.5	2.7	18.7	54.5	14.7	2.2	2.8	54.7
Zinc conc.	19.0	17.0	6.5	2.2	56.2	2.4	71.8	18.3	92.2	27.1
Tailing	78.9	0.7	...	2.2	0.7	0.2	12.2	76.0	4.7	9.4
Total	100.0						100.0	100.0	100.0	100.0

Feed pulp: 5 per cent plus 100 mesh; 80 per cent water, temperature, 54 deg. F.

Pounds Reagents Per Ton Ore

Lead Section

Sodium bicarbonate	4.0
Zinc sulphate	0.5
Sodium cyanide	0.4
Barrett No. 4 oil	0.25

Added in grinding section

Zinc Section

Sulphuric acid (60 deg. Bé.)	12
Copper sulphate	1
Steam-distilled pine oil	1
Xanthate	0.1

Added to lead rougher tailing

More recently, only the cyanide process has been used for the ores treated at the Timber Butte mill. At present the process is applied in two different ways. On ores containing high lead and iron, the cyanide is added directly to the crude ore, making a lead and a zinc concentrate as already described. On ores such as the Elm Orlu zinc ore containing relatively small amounts of lead and iron in proportion to the zinc, the ore is first subjected to a rougher flotation operation to make a lead-zinc concentrate, which is then given a cyanide treatment, as represented by the following results:

Table VI—Cyanide Re-treatment of a Differential Product, Elm Orlu Ore, August, 1925

	Weight	Assays: Ag Oz.	Per Cent "Insol."	Per Cent Fe	Per Cent Zn	Per Cent Pb	Recovery: Ag	Fe	Zn	Pb
Feed	....	3.8	...	2.8	11.5	1.2	....	....	....	....
Table Pb conc.	0.4	12.5	3.0	25.0	12.5	25.0	1.3	3.6	0.4	8.3
Flot. Pb conc.	1.5	65.3	1.8	3.4	18.0	50.0	25.8	1.8	2.3	62.5
Flot. zinc conc.	18.3	12.1	5.8	2.7	56.7	1.5	58.2	17.8	90.3	22.5
Tailing	79.8	0.7	...	2.7	1.0	0.1	14.7	76.8	7.0	6.7
Total	100.0						100.0	100.0	100.0	100.0

Feed pulp: 5 per cent plus 100 mesh; 80 per cent water; temperature, 54 deg. F.

Pounds Reagents Per Ton Ore

Lead section—Differential product for re-treatment

Lime	3
Barrett No. 4	0.20

Added in grinding section

Re-treatment section: Pulp 50 per cent water; temperature, 140 deg. F.

Sodium cyanide	0.4
Zinc sulphate	0.6

Added in agitation cells

Zinc Section

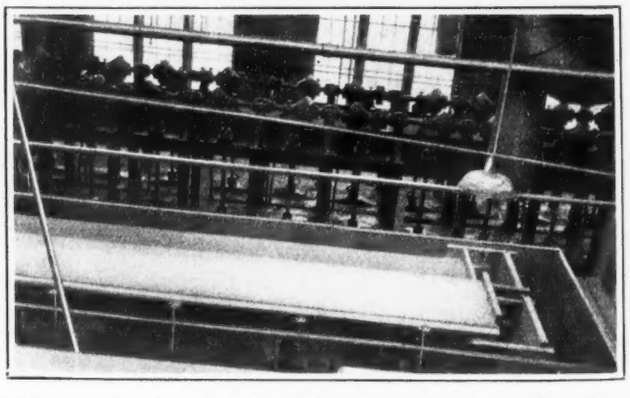
Copper sulphate	1.3
Sodium hydroxide	1.0
Pine oil	0.06
Barrett No. 634	1.5

Added to tailing from lead section

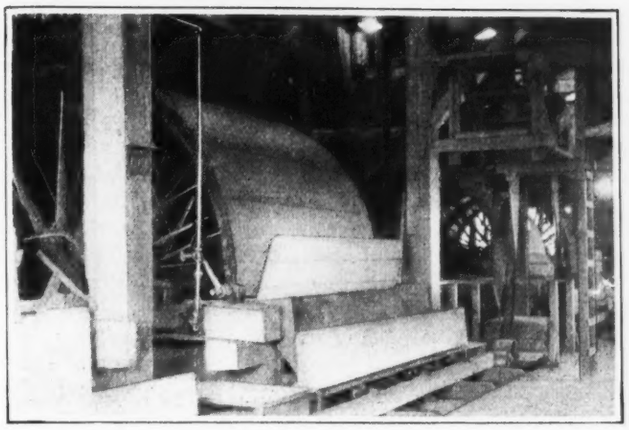
The exact procedure, as recently followed, is something like this: A selective lead-zinc product is made by the use of lime, xanthate, and Barrett No. 4, which assays about as follows:

Per Cent			
"Insol."	Fe	Zn	Pb
15.0	4.0	36.0	25.0

This product is cleaned once in a Callow cell, the tailing from this operation going to the zinc rougher circuit. The concentrate is thickened to a content of 50 per cent water or less. To the launder carrying the thickened pulp to the agitation cells (two in series) the sodium cyanide and zinc sulphate are added. In the agitation cells the pulp is heated to 140 deg. F. and given a time contact of about an hour. After the pretreatment the concentrate is cleaned twice in Callow cells, giving a lead concentrate for shipment as shown in the table above. The tailing from the final cleaning is returned to the initial cleaning of the product ob-



Callow cells for cleaning the concentrate produced by the Minerals Separation machine in the background



One of the Portland filters used to dewater the concentrates

tained from flotation cells in the lead rougher section.

It should be mentioned in conclusion that the metallurgical results are governed largely by smelting contracts and other economic considerations. A lead concentrate can very readily be produced running much lower in zinc than is shown by the above results but at a somewhat reduced recovery of lead in the lead concentrate, so that the improved metallurgical results would really mean less profit to the company. The grade of concentrate varies in accordance with local conditions. In addition to the lead and zinc concentrates, an iron concentrate has been produced which under certain conditions is of value for the iron content and associated gold and silver.

I am greatly indebted to W. N. Rossberg and his resourceful co-workers for their aid in working up the data presented in this paper, and for their cordial hospitality while I was in Butte. The contributions of the Timber Butte staff to the solution of the problem of the selective flotation of zinc-lead ores have been signally important and are universally recognized.

Revolving Screens for Mine Use

Of the four main classes of screens, the class that has received most attention is called a revolving or roller screen at coal tipples and a trommel or drum screen in ore-dressing plants. Such screens are common equipment at ore mills where perfect screening is more important than speed and where wet screening is usual for the sizes ranging from 15 to 2 mm. Revolving screens are so likely to break friable coal, however, that they are not favored for coal sizing and are not being installed in new plants. For coal sizing they usually take a dry feed, unless used in a washery. A revolving screen in its simplest form is a cylindrical frame with an envelope of wire screen cloth, perforated plate, or even bars, and with its longitudinal axis set at a slight angle. The screen receives material at the upper end, discharging the oversize at the lower end; it revolves slowly, and carries the particles of material up the rising side until gravity overcomes both their friction against the screening surface and any centrifugal force given them by rotation. Each particle rolls or slides down until it comes to rest and then is carried up the slope again. Detailed descriptions of various types of revolving screens are given in Bulletin 234, recently issued by the U. S. Bureau of Mines, Washington, D. C., and obtainable on request.

Ferric Sulphate Leaching at Inspiration

In describing the experimental work for treating mixed chalcocite and silicate copper ores at the Inspiration Copper Co. in Arizona, G. D. Van Arsdale, in a paper prepared for the A.I.M.E., states that roasting and leaching were found feasible and comparatively simple metallurgically, but that that method necessitates a high installation cost for furnaces and a rather delicate control of the roasting operation, with its cost including fuel. It was, therefore, decided to investigate a direct solvent method.

The literature on this subject was not encouraging as to the use and regeneration of ferric sulphate. Its experimental use as a solvent is, of course, old. Its regeneration by air did not appear promising, and regeneration by electrolysis was stated by all authorities to be possible, when accompanied by plating out of copper, only in very limited percentages; when higher percentages were needed a diaphragm cell was said to be indispensable. Nothing but standard apparatus was wanted; therefore a diaphragm cell was not to be thought of. Fortunately, it was found, notwithstanding these earlier statements, that it was possible to regenerate ferric iron electrolytically in concentration sufficient to act as an efficient solvent of copper sulphide, and at the same time to obtain a reasonable yield, in pounds of copper per kilowatt-hour, in a cell without a diaphragm.

Another apparent difficulty was the statement, in the literature, that for compounds of the formula Cu_2S only one-half of the copper was readily soluble, that the remaining half required heat and a long time. However true this may be, it was found that a reasonable sulphide extraction percentage could be had in not too long a time on ore crushed sufficiently fine. These facts—namely that an active and efficient ferric sulphate solvent can be regenerated in a non-diaphragm call by electrolysis with a reasonable yield of copper, and that the solvent thus made, under proper leaching conditions, will give sufficient sulphide extraction—constitute the features of the method developed.

The flow sheet developed for treating the mixed sulphide and silicate copper ores is given as follows:

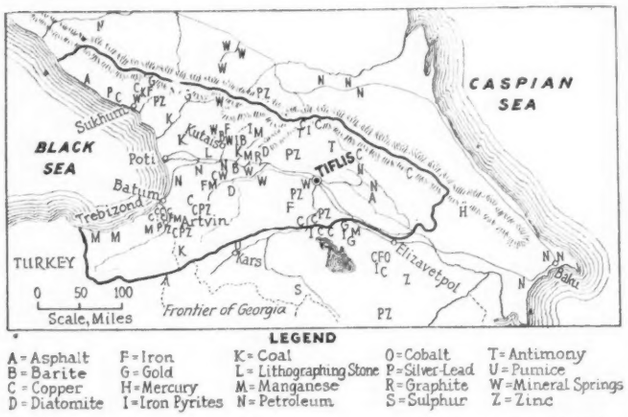
1. Coarse crushing to 1½ in.
2. Fine crushing to pass 3 mesh.
3. Conveying, without storage, to leaching tanks.
4. Leaching, consisting of maximum contact of nine days with acid ferric-sulphate leach liquor, applied counter-currently; that is, strongest solution to oldest ore, the leaching tanks being in series, and the solution taken to tank house after passing through the newest ore.
5. Washing, taking three days, and consisting of application of six washes, each of unit volume and advanced after each cycle, the strongest joining the copper solution to the tank house, and followed by a circulating wash pumped through the ore until sufficient soluble copper is removed. A portion equivalent to unit volume of this circulating wash is advanced to the sixth wash storage, being replaced by fresh water of the same volume, which may be passed over the leached ore, to recover iron as needed.
6. Discharge of tailings.
7. Electrolysis.
8. Solution of cement copper from circulating wash in acid solution from tank house, bypassed and returned with main solution feed to tank house.

Potentialities of Georgian Manganese

Rich and Extensive Deposits of Ore and Available Water-Power Suggest Ferromanganese Industry

By Victor C. Svimonoff
Mining Engineer, Los Angeles, Calif.

OF THE valuable mineral concessions at the disposal of the Russian Soviet government, perhaps none is more significant than that involving the manganese deposits of Georgia, which recently passed under the control of the W. A. Harriman interests of New York. Aside from political speculations, these manganese resources attract interest. Oil of Azer-



Map of the Georgian region, showing important mineral areas

baijan and manganese of Georgia: these are the economic foundations of Transcaucasia; they possess a magnitude and an importance which few persons, even in the engineering fraternity, realize.

When Georgian manganese is spoken of, reference is invariably made to the deposits at Tchiatourry, a district in the Province of Kutais. There are other locations where manganese is found in abundance, but, due to the intensive exploitation of this particular locality at Tchiatourry in the past, all allusions to Georgian or Russian manganese concern and pertain to these deposits.

The mineralized area comprises about 40,000 acres. The ore is found in stratified horizontal layers of various thicknesses from 6 to 30 in., the total thickness being from 5 to 8 ft., and the average content of manganese in the ore being 55 per cent. The following analysis is typical of the ore:

Constituent	Range, per Cent
Manganese	54.9 to 50
Iron	1.5 to 1.0
Oxygen	31.8 to 34.3
Impurities	11.8 to 14.7

Various authorities—Nikitin, Tzeitlin, Kostromin, Sapitsky, and Kossovsky — estimate the potential reserves of the manganese at from 100,000,000 to 200,000,000 tons.

It is claimed that nowhere in the world are such rich deposits of the ore to be found, both as regards quantity and quality. During the twenty years immediately preceding the Great War, 12,000,000 tons of the ore was exported. The largest consumers of Georgian manganese were Germany, which took 50 per cent; Great Britain, 26 per cent; the United States, 9 per cent, and France, 5 per cent. The home consumption was quite insignificant—so much so that the manganese operators ignored it entirely; and when at times, due to the inadequate supply of the manganese ore from the Russian region at Nikopol, the Russian steel industry sought the Georgian manganese, the latter was secured with some difficulty, the operators preferring to export it.

The Tchiatourry manganese deposits are mined by means of horizontal galleries driven along the beds of the ore. Very little timbering is required, the support being afforded by pillars that are left. The workings are free from gas, and very little water is met with, so that mining operations are simple. Picks and shovels, wheelbarrows, and occasionally small mine cars are used, the labor being native Georgians, who are intelligent and steady workers, although subject to political intrigues. The dressing and washing methods are primitive, and obviously the industry prospered in spite of the methods of exploitation, because of the abundance and richness of the ore.

There are other manganese locations in Georgia: for instance, in the Tchassavali district of Ratcha, Province of Kutais; at Manglis, district of Tiflis, Province of Tiflis; and at Ubissy, district of Dzerouly. These locations are close to the main line of the Transcaucasian railroad and are similar to the Tchiatourry deposits, geologically speaking.

A considerable loss to the future of the Georgian manganese industry was caused by the Soviet acquiescence at the time when the Turks annexed in 1921 the rich territory of Artvin, which the Georgians could not retain without some assistance from outside sources. This district is rich in copper and manganese, at Kvartzkhana-Dzansoul and Kartla, and constituted an integral possession of Georgia from mediæval times. A less promising manganese location at Charbietty, Artvin territory, was for some time worked by an Englishman named Stewart, in the 90's of the last century, but owing to the high cost of transportation of the ore the enterprise was abandoned.

In view of the abundance of water-power in the mountainous regions around the Georgian manganese deposits, splendid prospects await the capitalists who invest their money in developing the enterprise. A certain Russian engineer whose name I do not recall was making a report to the viceroy of the Caucasus; and, among other surprising things, mentioned that the very same manganese that was exported from Russia for the paltry sum of 7c. per pood (1 pood = 36 lb.) came back to the Russian steel industries in the form of ferromanganese at $1.50 per pood.

One of the Georgian engineers that I had the pleasure of meeting the last time that I traveled to Soviet Georgia estimated that that country possessed at least 3,000,000 hp. that might be made available by harnessing her waterfalls and mountain streams. Doubtless a magnificent ferromanganese industry some day will be established at Tchiatourry.

Tin Mines in Siamese Malaya

Tin mining companies working and prospecting in the Siamese portion of the Malay Peninsula number more than twenty in all, and with one or two exceptions are of British nationality, with head offices in Penang or London. According to official records a total of forty-four mining leases, covering 1,587 acres and eleven temporary mining leases of 163 acres, were issued during the last quarter of 1924, when production amounted to 35,835 piculs (1 picul = 133⅓ pounds).

Geological Section Along Rio de San Lorenzo, in Sinaloa, Mexico*

By W. Horatio Brown
Tucson, Ariz.

THE GEOLOGIC SECTION discussed herein was made while traveling muleback from Quilá to Guadaloupe de los Reyes, in the State of Sinaloa, Mexico. These notes may be of interest, inasmuch as they show the geology to be entirely different from that given on the map of North America compiled by Willis.[1]

The route shown on the map was along the Rio de San Lorenzo to Alayá, then across country to Guadaloupe de los Reyes near the Durango border. The relief of the region gradually increases from west to east, the rolling country near the railroad giving way to rugged terrain around Guadaloupe de los Reyes.

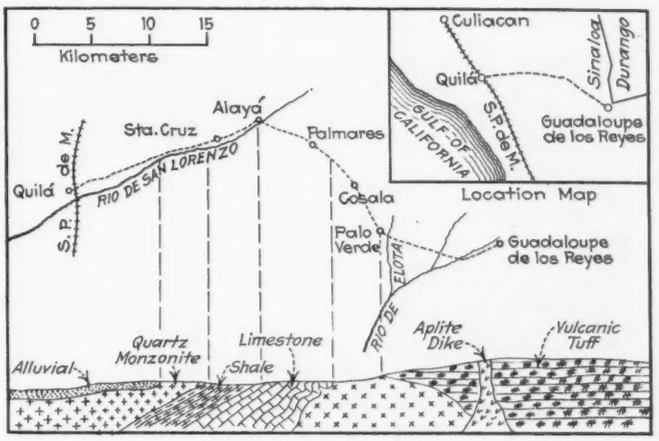
The San Lorenzo River valley above Quilá is broad and filled with fine alluvial soil, but in the immediate vicinity of the river has been cut through to the underlying basaltic flows. These flows also seem to cap hills along the sides of the valley. A series of calcareous shales appears just west of Santa Cruz. The contact between the flows and the sediments was not seen, but it seems probable that the volcanics are the younger, as they have the same dip and strike as the sediments and appear to overlie them. The sediments around Santa Cruz strike north and south and dip to the west. Here they are shales and shaly limestones. Above Santa Cruz, at Alayá, older and more massive limestones appear and extend continuously, with the exception of one small volcanic outcrop and a bed of sandstone, to the western side of the divide between Palmares and Cosala, where they are cut off by quartz monzonite. This is probably the Comanchean limestone found by Böse in Durango.[2] It dips from 15 to 20 deg. near Santa Cruz, and the dip increases to the east, until at Palmares it is standing vertically. Numerous remains of fossils were noticed, but few could be recognized, on account of the recrystallization. One ammonite cephalopod was seen.

There are numerous silver-bearing fissure veins in the shales and shaly limestones around Santa Cruz. These veins strike northwest and have well-defined walls. They have been worked at several different periods, and old workings and caved "tajos" are numerous. The ore consists of white quartz containing pyrite and one or more of the silver sulphides.

Ore Deposits Occur as Replacements

Pyritic lead-zinc-silver deposits occur as replacements in the massive limestone near Palmares. On the eastern side of the mountains between Palmares and Cosala the limestone is intruded by the quartz monzonite on which the town of Cosala stands. There is some metamorphism of the limestone at the immediate contact, the limestone being recrystallized and in places altered to garnet. I was shown pieces of magnetite which were said by natives to come from the limestone near the contact. The quartz monzonite is cut by aplite and camptonite dikes.

About halfway between Palo Verde and the Rio de Elota the quartz monzonite disappears under a series of volcanics. The tuff at the base of the series contains rounded boulders of the quartz monzonite. These volcanics are continuous to Guadaloupe de los Reyes and the Durango border. For the first half of the distance between the Rio de Elota and Guadaloupe de los Reyes rhyolitic flows predominate. Near the town the flows are largely andesitic, although fine-grained quartz-monzonite and rhyolite dikes cut the volcanics.



Geological section from Quilá to Guadaloupe de los Reyes, Sinaloa, Mexico

The Guadaloupe de los Reyes mine, for which the town is named, has had a long and notable production record. The veins cutting the volcanics are large, and even the textures and mineral content show a remarkable similarity to the San Juan region of Colorado. If suites of rock specimens from the two districts were set side by side it would be difficult to distinguish between them. The area around Guadaloupe de los Reyes is very rough and high, but the topography has not been modified by glacial action as in the San Juan.

There seem to be at least two distinct periods of vulcanism in the State of Sinaloa, with mineralization accompanying each. The Cosala quartz monzonite and ore deposits are probably of Cretaceous age, as they cut Comanchean (?) limestone. The deposits of Guadaloupe de los Reyes cut post-Cretaceous volcanics and are probably of Tertiary age.

In the region of Tertiary mineralization, all of the deposits examined were similar in character, although differing in values. In the region of Cosala, however, where the small batholith had been deeply eroded, a distinct zoning of the deposits could be noted. The magnetite came from near the quartz monzonite; the pyritic lead-zinc-silver ores were farther away, and farthest of all were the silver deposits of Santa Cruz.

*Published by permission of R. L. Chase, consulting engineer, Glendale, Calif.

[1]Map accompanying Professional Paper 51, U. S. Geological Survey.

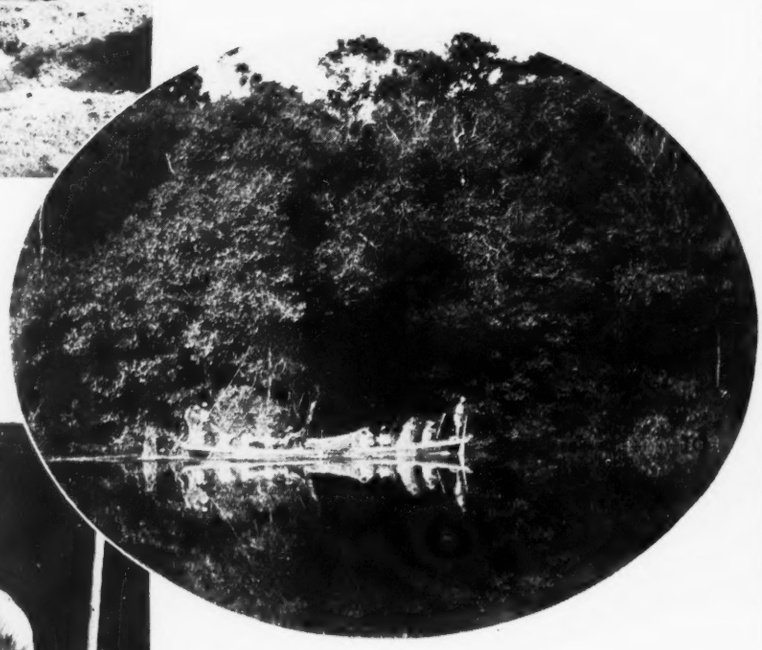
[2]Böse, E.: Algunas Faunas Cretacicas de Zacatecas, Durango y Guerrero: Inst. Geol. de Mexico, Bol. 42.

Diamond Mining in British Guiana

The photograph on the right shows a prospect hole in the diamond bush. This region was described in Lloyd T. Emory's article in the Oct. 3 issue

On the left is shown a hand-operated tom, used extensively in both diamond and gold areas

The verdant vegetation of the river banks stands out behind this loaded boat en route for the diamond fields



The final stage of diamond washing is exhibited in the adjoining cut. The diamond-iferous gravel is washed by hand in sieves

Limestone Quarrying at Sonora, California

Small-Scale Operations—Lime Burning in Vertical Kilns—Marble Quarrying by Modern Methods—Stripping Limestone Deposits by Ground Sluicing

By George J. Young
Associate Editor

SONORA, CALIF., is on the eastern edge of the Mother Lode belt. It is one of the old mining towns of the foothills. A series of limestone lenses occurs in the Calaveras formation (carboniferous), which trends northwesterly. These lenses of highly metamorphosed limestone, marble in part, are irregular in outline and in size. Just south of Sonora a wide lens is being worked by the Pacific Lime & Plaster Co. North of Sonora in the vicinity of Columbia the marble and limestone deposits cover an extensive area which has been stripped in part by the early placer miners. Portions of this area are being exploited by two marble companies, the Columbia Marble Co., of San Francisco, and the Bell-Columbia Marble Co. Both companies are quarrying an excellent grade of white mottled marble for architectural purposes. The limestone deposits contain dolomite in places, and this is also mined.

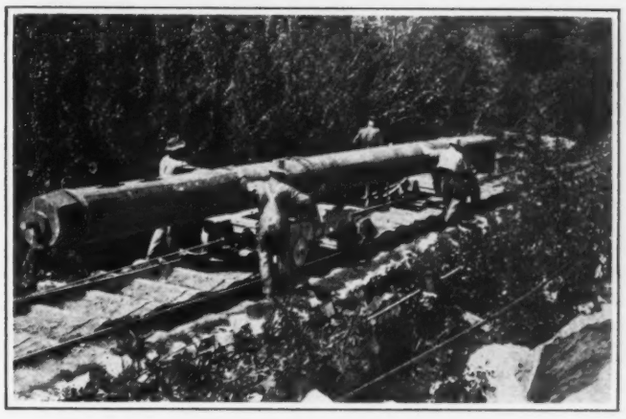
An old marble quarry near Columbia. This quarry is being reopened

The plant of the Pacific Lime & Plaster Co. is a short distance south of Sonora and is served by the Sierra Railroad, which transports all of the product of the quarries to the coast markets. The company operates oil-fired kilns of the shaft type. Eight are of small and one is of large diameter, the small kilns being served by two burners and the large kiln by four. All kilns are provided with steel hoppers and bottom discharge doors of the rack and pinion type. The lime product is received in steel barrows, the lump product removed by hand and placed in steel containers. The product of two of the kilns is dumped into a grinder of the coffee-mill type, the discharge being elevated by a bucket elevator to a lime-hydrating plant, where it is temporarily stored in a hopper.

Lime burning has been systematized. The steel kilns are lined with from 18 to 24 in. of Stockton firebrick, backed by a layer of diatomite heat-insulating brick. The firebrick lining extends from a line 1 ft. below the firebox to a line 2 or 3 ft. above the firebox, or a total distance of from 5 to 5½ ft. Linings last five or six months, although the record for one lining is a year. The small kilns require from 1,250 to 2,000 firebrick for relining. The burner openings are on opposite sides of the shaft and are large enough to serve for barring the kiln. The oil fuel is atomized by steam at 40 lb. pressure supplied by a boiler. All of the kilns are equipped with pyrometer leads and are connected by a switchboard with a Thwing indicating instrument. The temperatures in the active calcining zone of the kilns can be determined as often as necessary. Temperatures are kept as nearly as possible at 1,640 deg. F.

In addition to lump lime and hydrated lime, fine-crushed limestone is also produced. The crushing unit for this product consists of a receiving bin, jaw crusher, bucket elevator, and bin. The crushed rock bin supplies a feeder and Williams hammer mill, the product being elevated to a Hum-mer screen, which deliveres a 20-mesh size and returns the oversize to the Williams mill. The finished product is received in a bin and delivers to cars, which are hauled up a gravity plane to the shipping house, where the limestone is loaded directly into steel railroad cars. Dust in loading is controlled by water sprays.

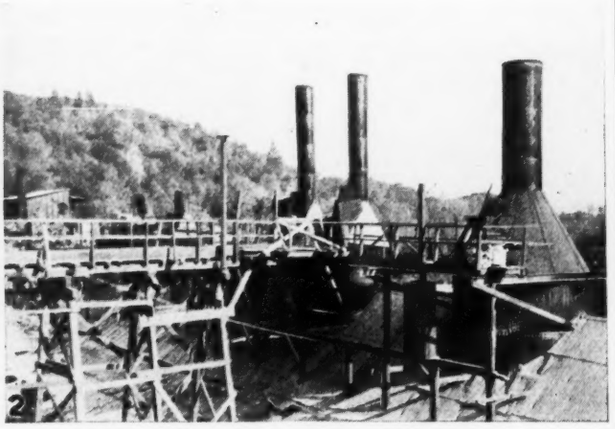
Two quarries are operated, one consisting of a single floor extending into a hillside and developing a high bench and the other a pit about 30 ft. below the general level established by the floor of the first quarry. Both quarries are served by radiating tracks. One-ton steel cars are loaded by hand and trammed to a central point. In the case of the pit the cars are hauled by wire rope and hoist up an incline, where they are disconnected and reconnected to the cable of the incline to the calcining plant. The latter incline also serves the



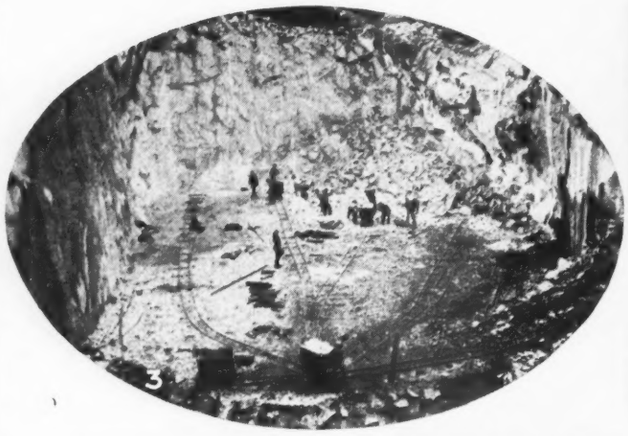
Taking a derrick down a steep incline to the quarry

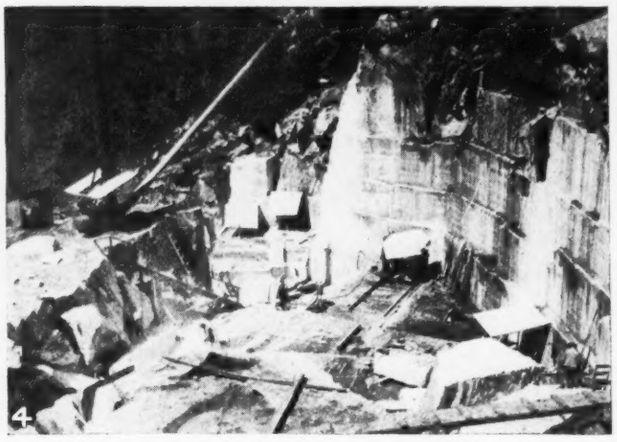
Limestone quarry and plant at Sonora

Lime burning and hydrating plant



Lime burning plant

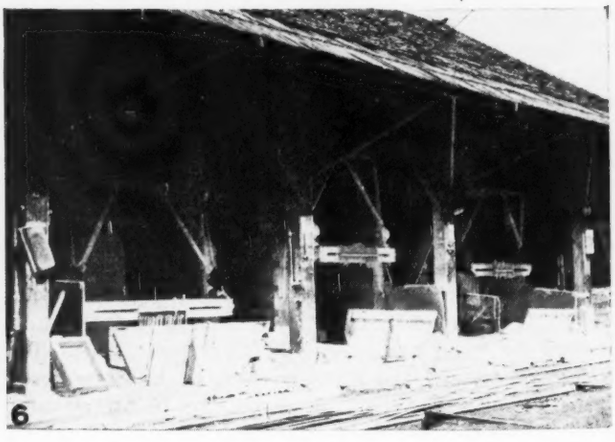




Marble quarry north of Sonora

Oval, at left: Limestone quarry at Sonora

Ground sluicing surface soil



Marble sawing plant

first quarry. Benches in both pits are drilled with holes 12 to 16 ft. deep. One-inch hollow hexagon steel and rose bits are used. Two Ingersoll-Rand Jackhamers are used for drilling. In addition a smaller drill of the same type is used for block-holing. The limestone is reduced to 10 in. in size by hammer work and selected in loading the cars. Compressed air is supplied by two motor belt-driven Sullivan compressors, one 10x10 in. and the other 9x8 in. in size. The powder ratio is about 0.4 lb. per ton. Electric blasting caps wired to connect with a 110-volt lighting circuit are used for the deep holes. Holes are drilled 5 ft. apart and 4 ft. back from the face.

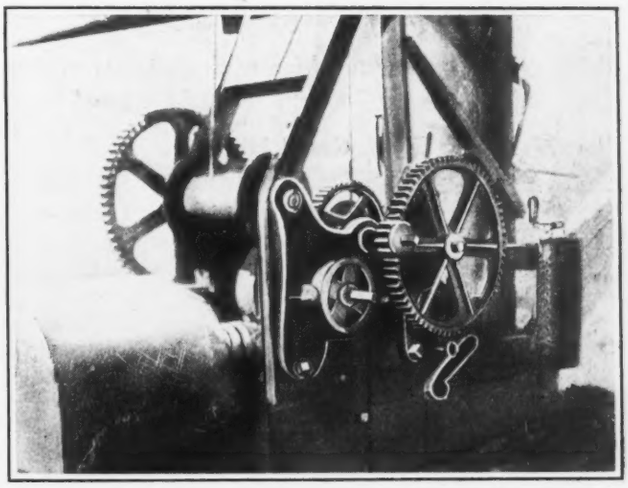
On the level established by the kiln-charging track and to the north of the kiln plant limestone is being mined in several stopes, which have been opened out from an adit. The rooms are 22 ft. in width, separated by 10-ft. pillars. Drifters mounted upon columns are used to drill 6- to 9-ft. holes. The broken limestone is block-holed and reduced by hammer work to kiln size and loaded by hand into cars. Two drifters are used in this work.

The marble quarry of the Columbia Marble Co. is several miles north of Columbia on the slope extending to the Stanislaus River. The quarry and plant connect by a narrow road to the highway. A marble sawing plant equipped with eight gang saws, operated by motor, is at the road head. The present quarry is connected by a single-track incline with the sawing plant. A motor-driven hoist is used to lower supplies and haul the blocks of marble up the incline. The quarry is on the side of a knoll. The marble is dolomitic, containing 19 per cent magnesia. A number of benches have been opened out. The equipment is modern. A duplex Ingersoll-Rand compressor, 14x12 and 9x12, driven by a 75-hp. motor and short-belt drive, supplies compressed air for the quarry tools.

The marble is cut, usually by two channeling cuts, a back and a side cut, and freed from its bed by drilling a line of bed holes through the base of the block and splitting by plug and feathers. The large blocks are reduced to smaller ones by drilling lines of holes through the blocks and splitting by plug and feathers. The tool equipment consists of an air-electric Ingersoll-Rand No. 7 channeler; two bar channelers; two 248 Ingersoll-Rand drills (for bed holes); three B C R 23 Jackhamer drills, and one Denver 93 hand-held drill. The small drills are used in dividing the blocks. A sharpening shop is at the edge of the quarry.

The derrick equipment consists of two electrically operated derricks, each of 15 tons' capacity. An additional derrick was being installed when I visited the property. All three derricks are of a type designed by W. D. Bannister and are satisfactory in operation. The details of the driving arrangement are shown in the accompanying illustration. A 5-hp. motor is used on each derrick. Several tugger hoists are in use at the sawing plant for handling cars. All operations are under the supervision of W. D. Bannister.

The Bell Columbia Marble Co., which had completed financing and had just started operations at the time of my visit, is preparing to open out a quarry on a hillside close to Columbia. The overlying soil was being removed by ground sluicing. The company has a Sullivan air compressor and miscellaneous tools, but has not yet completed its installation of equipment and facilities.



Derrick equipment of the Columbia marble quarry. A 5-hp. motor drives the rope drums through worm and spur gears

The three enterprises described are excellent examples of relatively small-scale operations, demonstrating what can be done with well-selected mechanical equipment and conservative management. All three have market outlets covering a large area. The Coast cities require miscellaneous structural materials. Marble and lime are in demand and the chemical and manufacturing industries are in the market for the lime and its various products.

Nickel Industry Shows Little Change from Last Year

The smelter of Société Le Nickel, at Thio, New Caledonia, is reported to be operating at capacity, about 4,000 tons of ore being treated monthly, according to *The Metal Bulletin*. New deposits of ore are said to have been opened up at Karambé. The exports of nickel matte for the first half of this year totaled 1,886 tons, compared with 2,414 tons in the first half of 1924.

At a recent meeting of the International Nickel Co. the chairman stated that the company had reached a point where the falling off occasioned by the reduced demand for armaments had been replaced by industrial demand, which he considered a more satisfactory type of business.

With regard to the geological investigations undertaken by the Finnish authorities at Petsamo, it is announced that the ores located there are of high copper and nickel content. Samples sent to Helsingfors have contained 7 and 11 per cent of nickel and copper respectively.

The ore output of the Sudbury (Canada) nickel producers during the first half of 1925 showed a decline compared with the corresponding period of last year, due, it is stated, to the closing down of the British America Nickel Corporation's properties. During the first six months of the year 633,616 tons of ore was mined, against 812,860 tons in the first half of last year, 617,802 tons of ore smelted, compared with 707,344 tons last year, and 33,704 tons of matte produced, compared with 33,287 tons a year ago. There were 18,744 tons of matte refined, compared with 21,620 tons in the first half of last year, the exports of matte at 14,269 tons, showing the only increase, being 2,000 tons greater than last year.

Virtues of Blue-Sky Laws

Statutes Based on Definite Plan of Exploitation—Speculation Not Prevented—Investors Protected

By J. Grant Hinkle
Secretary of State, Olympia, Wash

THERE are forty-two states which have laws regulating the sale of stocks and bonds, but in some of these states mining stocks are exempt. Mine promoters have considered this a wise provision, but the reaction has been disappointing. Many of the states have had blue-sky laws on their statute books for ten to fifteen years. The people living in those states have become familiar with their purposes. Many know how to use them in obtaining information regarding the securities offered through the mail or by personal solicitation. The writer of this article lives in a state which exempts mining stocks from operation of its blue-sky law. He has lived in a city in which the mining industry had a very large part in its upbuilding and is no small factor at present in that city's support. He is an ardent supporter of the mining business and has contributed his share in grubstakes and stock purchases.

The first and greatest harm done in a state which exempts mining stocks is in the invitation it extends to all the fakers and bunco artists who make their living by selling worthless securities. These human hyenas move along the line of least resistance, and by their work make it almost impossible to sell the stock of a legitimate and worthy mining enterprise in our state. The blue-sky laws of the Western states will not permit more than 20 per cent to be paid for promotion, and a wildcatter would be ostracized by his associates if he looked at anything paying less than 50 per cent for promotion. Mining being exempt, a contract providing for very high commissions may be made with the salesman, who takes not only 50 per cent or more, but after a strenuous week or so manages to depart with 100 per cent of all cash paid to him.

The next injury comes when an honest enterprise goes to an Eastern state in good faith soliciting money by the sale of stock to develop its prospect. Many of the states will not entertain the application without the production of a permit granted from the state where the company or firm owning the prospect is incorporated.

Some of the states will reluctantly receive the application. If a promoter can show an engineer's or geologist's report from the home state, it would have a very material influence, although no guarantee of acceptance by the state in which he was soliciting the sale of his stock. One case is known of a salesman who had been turned down in Washington who tried to finance his enterprise in New York. Meeting the salesman some weeks later I was interested to hear his report. It was to the effect that he was asked if he had a permit from his home state. He was honest enough to tell his intended customer that he had not, and added that he came back without making a single sale.

A third hardship comes from inquiries to my office through the mails. The party making the inquiry may live in a state that has had a blue-sky law for years, and from the tone of the letter I know he is interested. Some of them mention having engineers' reports, assays, and a showing of development already made. The spirit of the letter of inquiry is such that you know the party is ready to sign on the dotted line, but having knowledge of the blue-sky law in his state, writes to the authorities of the state where the mine is located, asking for an official report.

In one month I have had as many as forty-one inquiries concerning mining properties here in Washington. To all of these I have had to report what the official records show and then to add that I do not know of the field of operation, nor can I give them any financial statement. I know that knocks that sale into a cocked hat, and I am powerless to do otherwise. The very facts they want I cannot give.

Law Based on a Definite Plan of Business Operation

I believe most mining men have a mistaken idea in the application of the blue-sky laws of the various states. Many believe the laws are written around the success or failure of a prospect. Such is not the case. The law focuses on one word of four letters—PLAN. If anyone cares to read the various laws he will see that they are not enacted to prevent speculation. If such were the case, the development of all enterprises would be seriously hampered or arrested.

All business must assume the risk of success or failure that comes from conditions beyond human control, from mismanagement, or from crooks in the directing. The daily papers report the failure of banks, long-standing industrials, railroads, and other transportation lines, as well as mining companies.

The law, then, only demands a "plan" that is just, fair, and equitable, to the man who places his money in the stock or bond of the enterprise. That will mean that the promoters shall not claim an undue amount of the original capitalization for their services, that they shall not pay an exorbitant commission to stock salesmen, and that their budget showing the purpose of development and the need of a certain sum is within the lines of good business rules and judgment. In original issues of purely speculative ventures, the stock subscription is made to read that the subscriber recognizes the speculative nature of the proposed development, and that he has carefully examined the plan of development, and knows the use to which his money will be placed. Thus, he can never charge the corporation or any person with misrepresenting the investment to him.

Legitimate mining suffers in any state not having such securities placed under the provisions of a blue-sky law. It will be better to have none of the states include mining than to have conditions the way they are now, with part exempt and part under supervision. Instances are on record where mining companies have come from other states to the State of Washington and have demanded the right to file their papers and to qualify under our blue-sky laws. When refused, they protested and would not go so far as to qualify their corporation, knowing they could sell their stock without hindrance. These came from states that had no blue-sky supervision over mining. I conclude, therefore, that those laws work no hardship on a bona fide mining venture or the organizers or promoters would have qualified their company and have gone about the selling of their stock unhindered.

It is not good for the mining business to have controlled and uncontrolled conditions as they now exist in the several states. Lack of uniformity of laws often works an undue hardship upon the owners of meritorious mining property.

Useful Operating Ideas

Replacing Roll Shells

A simple and rapid method for replacing roll shells is in use at the crushing plant of the Miami Copper Co., Miami, Ariz. The rolls are 78 in. in diameter by 24-in. face. They are held in place by the usual tapered fixed and removable centers held together by through bolts. In replacing roll shells, the old shells are first cut with

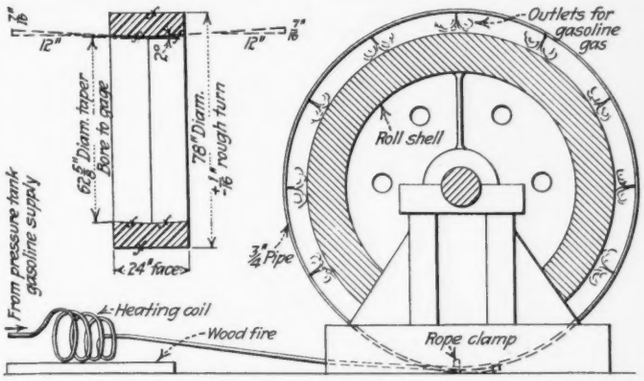


Fig. 1—Arrangement of heating coil and gas pipe

an acetylene torch and removed. The new roll shell is placed on the fixed center, the movable center is put into place, and both centers are bolted up tight. Before heating, when tight, the centers overlap the sides of the roll shell one inch on each side. The roll is then placed upon two steel jacks, which support it in a vertical position, leaving sufficient space beneath the shell. A ¾-in. pipe is looped around the roll shell and held in place by a rope clamp which binds the free end

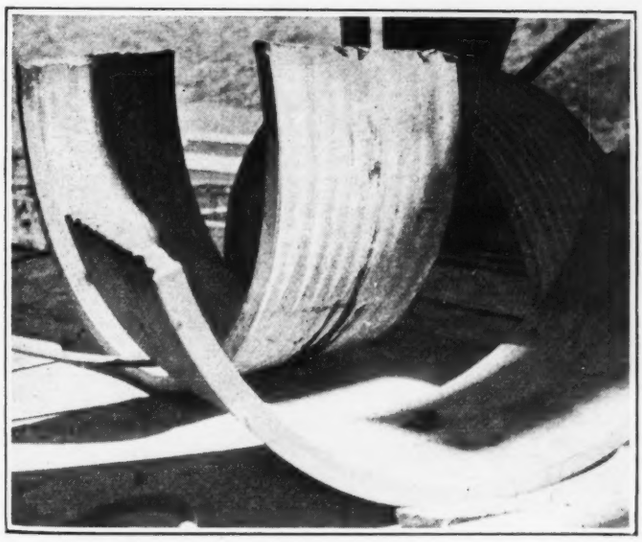


Fig. 2—Roll shells are removed by cutting with torch

of the pipe to the pipe which extends to a coil and thence to a gasoline pressure tank. The encircling portion of the pipe is pierced with small holes at intervals and is supported so as to be equidistant from the center plane of the roll shell at all points. The coil is heated by a small wood fire and the gas as it issues from the holes is ignited. This affords a number of heating points on the outer surface of the roll shell. The shell is heated only to a temperature at which it "fries." When the shell has been sufficiently heated the gasoline supply is shut off, the encircling pipe is thrown aside, and both centers are driven flush with the edge of the shell by a ram suspended from a wire rope. The bolts are tightened and the roll is ready to be replaced. Roll shells last about thirty days. About an hour is required for heating and less than half an hour for finishing the job.

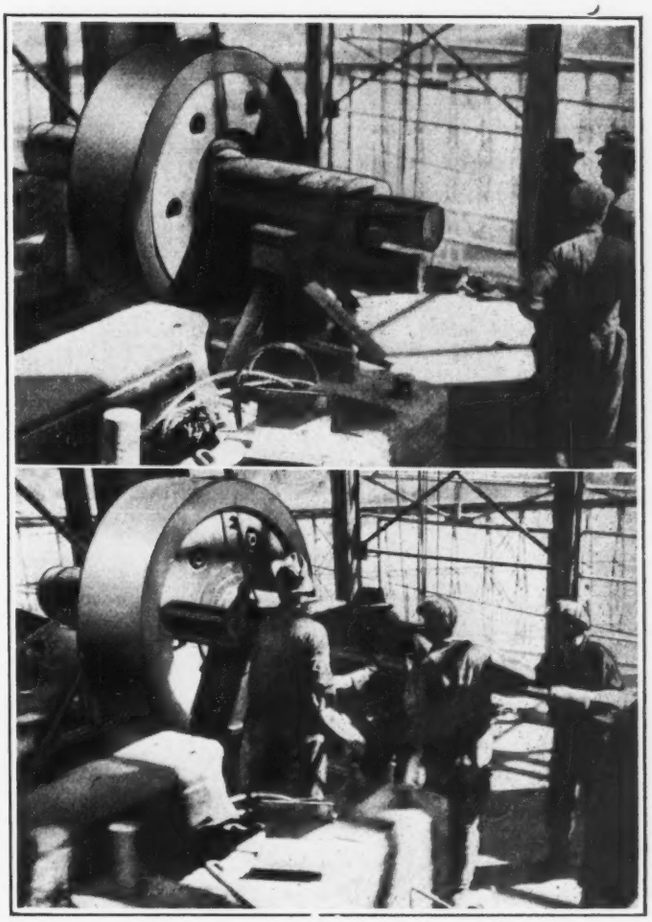
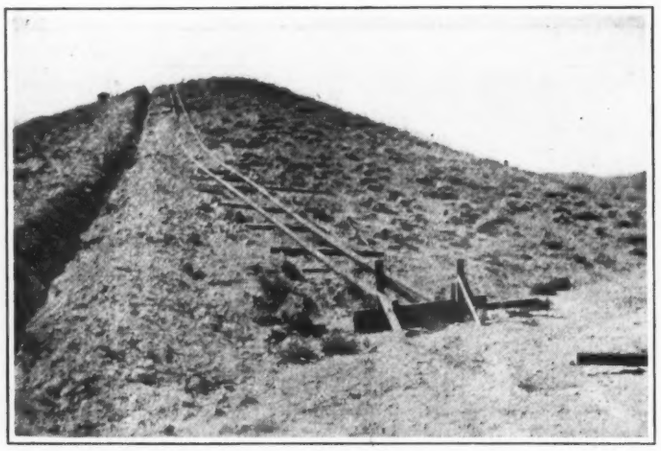


Fig. 3—Upper: roll shell being heated in place; lower: roll shell centers driven into position

Cost of Welding Water Mains

Recently a water main was installed by the Mason Valley Mines Co. of Nevada between its No. 2 pumping station and the Bluestone mill. The pipe line consists of 4½-in. o.d. lapwelded casing in lengths of 21 ft. Each pipe joint was welded with an oxyacetylene torch, the ends of the pipe lengths being beveled. The length of the pipe line is 8,893 ft., the last 500 ft. consisting

of a pair of pipes. Three weights of casing were used upon the pipe line, the first 2,600 ft. being constructed of casing which weighed 10.79 lb. per ft., tested to 1,600 lb. per sq.in.; the next 3,500 ft. weighed 8.635 lb. per ft., tested to 1,200 lb. per sq.in., and the last



Welded pipe sections ready for placing in ditch

2,793 ft. weighed 6.609 lb. per ft., tested to 800 lb. per sq.in.

The average length of the pipe sections was 21 ft. The number of welds was 447. The labor required was as follows:

One oxywelder, 44⅝ shifts at $8	$357
Two helpers, 44⅝ shifts at $4 each	357
Total	$714

The supplies required totaled 16 cylinders of oxygen, 3,600 cu.ft., at a cost of $186.30; 27 cylinders of acetylene, 7,425 cu.ft., at a cost of $141.88; and 185 lb. of welding sticks costing $33.80. The total cost for labor and supplies was $1,075.98. The average number of welds per shift was 10; cubic feet of oxygen per weld, 8.05; cubic feet of acetylene per weld, 16.61; and 0.41 lb. of metal per weld.

As the welders obtained experience the number of welds increased, averaging about 25 welds per shift at the close of the job. As high as 34 welds were made on one shift. With an experienced crew 20 welds would be a good average. The actual time of welding a joint varied from six to twelve minutes.

The first 4,000 ft. of pipe was swabbed with asphalt inside and outside at each joint, which caused a delay of twenty minutes in allowing time for the pipe to cool. The remainder of the pipe was not swabbed. The foregoing data were obtained from Emmet D. Boyle, manager of the Mason Valley Mines Co.

Design of Finger-Bar Chute Gate

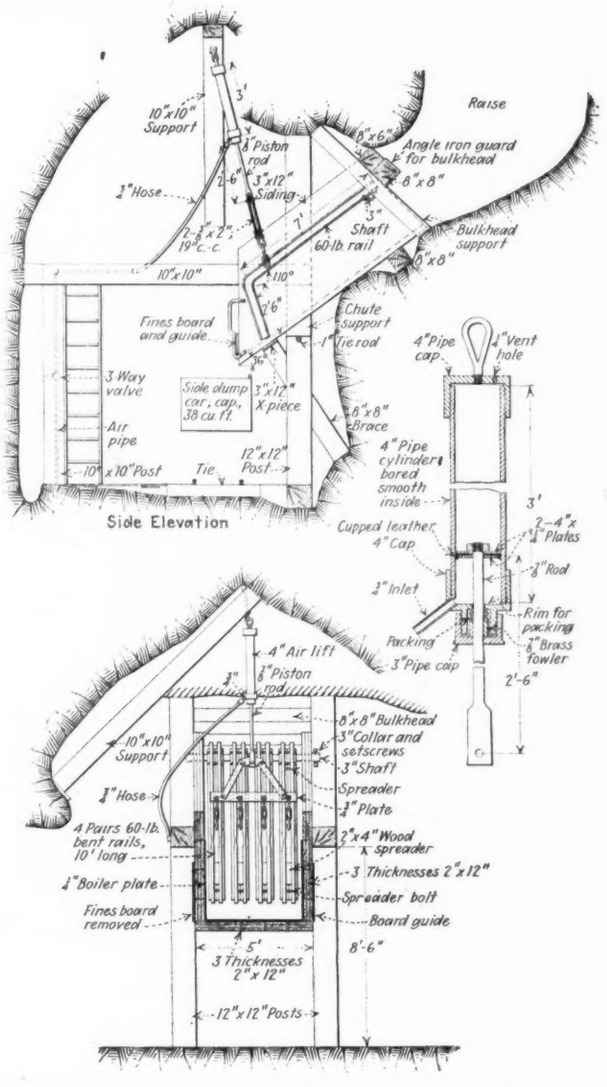
By S. S. Siegfus

The accompanying drawing indicates the design of a chute gate used at the Finch quarry of the Northwestern Magnesite Co. at Chewelah, Wash. The gate is used for loading cars and handles the quarry product, which does not contain a large proportion of fines, as these are rejected. The chute has a clear opening of 4½ ft. and is lined with ¼-in. boiler plate. The gate consists of four sections of 40- or 60-lb. rails, which are bent at one end, forming a finger 2½ ft. long at an angle of 110 deg. to the other leg of the rail.

A crossbar to which are attached short lengths of chain connects the rail lengths to a bridle, which is attached to the crosshead of an air cylinder. The air cylinder consists of a 3-ft. length of 4-in. pipe turned smooth on the inside. A ⅞-in. piston rod, to which are attached two ¼-in. circular plates and a cupped leather, forms the moving part of the cylinder. The upper end of the cylinder is closed by a screw cap in which a ¼-in. hole is bored and to which is attached a ring by which the cylinder is suspended from a clevis. The lower end of the cylinder is provided with a packing gland and a ¾-in. air inlet. The cylinder is single acting, lifting the finger bars on the up-stroke. The rotating end of the rails is attached to a 3-in. shaft, which projects through the check pieces of the chute.

A fines board is arranged at the lip of the chute and is held in place by iron guides. The size of the rock determines the weight of rail to be used with this type of chute gate. A 40-lb. and 60-lb. rail have been found to be satisfactory with the 4-in. cylinder. A heavier rail would require a 5-in. cylinder.

It is estimated that the chute gate shown in the drawing can be constructed for about $300. One of these gates has passed 350,000 tons, replacements being required only for the boiler-plate lining and the check beams forming the bulkhead.



Front and side elevation of finger-bar chute gate

Discussion

Frequency of Lightning Strokes and Geological Formation

THE EDITOR:

Sir—From observations made in southern Oregon, I have come to the conclusion that a possible relationship exists between the frequency of lightning strokes and geological formation. In certain limited areas the strokes seem to be more frequent than in the surrounding area.

The Forest Service keeps a record of fires caused by lightning, but no record is made of the lightning strokes that do not cause fires. It is natural to suppose that only under very favorable conditions will a lightning stroke cause a forest fire. Such fires are mainly started in dead trees or very pitchy trees. One also can presume that green trees are better conductors than dead dry trees and will attract more strokes without causing any fires, and that a large number of strokes reach the ground without going through a tree at all. Only during the last two years the lookouts of the National Forests in the western states have been gathering data on lightning storms, such as directions, rate of travel, the number of strokes which reach the ground, and like facts. The data so far have not been compiled and may not be available for a long time.

Mr. Kircher, Acting Assistant Forester in Washington, D. C., believes that my suggestion of a relationship between frequency of lightning strokes and geological formation opens up an interesting field and would be decidedly worth while following up.

No doubt mining men have observed the effect of lightning strokes in mineralized areas. Sometimes the rock and minerals have been fused together into lumps of considerable size. I myself have found such masses weighing several tons. The effect of strokes is noticeable, however, in many other ways without producing molten masses. If the ground is wet and forms a good conductor a disturbance of the ground takes place without showing any sign of fusing at the place of entry, or such light alterations as will be obliterated in a very short time by weathering. To come to a definite conclusion, a large number of observations must be available from both forest rangers and mining men.

I appeal to the mining engineer to help me to collect such data and shall be glad to receive information about existing literature, and data already collected or to be collected, about this subject.

GEORGE SCHUMACHER.

P. O. Box 1096, Medford, Ore.

Vertical Side Lines Wasteful?

THE EDITOR:

Sir—I would like to call attention to a point generally overlooked in the recent discussion of the proposed revision of the mining law, that seems to me to be, if not the most important, at least just as important as any other point brought up.

In *The New Republic* recently was a series of articles by Stuart Chase, entitled "The Tragedy of Waste." In the fourth article, "The Waste of Natural Resources," he has this to say about the waste of petroleum:

"Petroleum collects in great underground pools. Over the top of the pool gathers gas—valuable gas for two reasons: it has in it many of the properties of the oil itself; and only by its pressure downward on the surface of the pool may all the oil in the pool be pumped and driven above ground. Now, the pool and the gas over it must be treated as a unit. One engineering control should govern it, allowing only enough wells—reasonably spaced—to give the most effective outlet for the oil. Care must be taken to save the gas below in order to help the oil upstairs. Gushers must be resolutely choked; seepage and water infiltration must be guarded against; in brief, the known technical arts applied, and the job done aright. In this way it is possible for nearly all the oil in the pool to reach the pipe line—and in no other way is it possible.

"No such procedure takes place under the American plan. A strike is made, land is staked out, lots are bought, and feverish drilling commences. There may be ten times as many wells as the pool can efficiently support, and the wells may be placed with no consideration for efficient exploitation. Gas is not controlled; seepage is not controlled; incoming water is not controlled; gushers are not controlled—nothing is controlled but the property lines around the lots. The owner drills as many wells as he can, as fast as he can, and preferably along the next owner's boundary line, in order to get the lion's share of the pool's activity. Thus the pioneer, with his stark individualism and his property laws which will not work with geological units, has succeeded in throwing away three barrels of oil out of four. While the engineer, who handles geological units with geological laws, could save the whole four barrels. As a result of our methods, about half the underground supply of petroleum in America is gone forever, and the balance, at present rates of demand, is estimated to last only from thirteen to twenty years."

In the place of geological unit read economic unit; economic unit is more in harmony with the subject matter.

What is said about petroleum applies to mineral veins; every vein is an economic unit. To make it possible to divide a vein up so that many different individuals or companies may work it, as certainly would be done by a vertical side line law, is not an economical proposition. Instead of such a law we should have one that would make every vein even more of an economic unit than the present law makes it. A lawsuit may be wasteful, but a vein worked without unit of control is more wasteful. None of the proposed laws offers a solution of the problem of waste due to the present laws. The problem is yet unsolved.

WILLIAM CROCKER.

Prescott, Ariz.

The Doodlebug and the Peach Limb

THE EDITOR:

Sir—In *Mining Journal-Press* of Oct. 10, page 579, "A Miner," of Saltillo, Coahuila, Mexico, raises the question as to the efficacy of a forked peach-tree limb. This recalls a boyhood episode. A "water witch" stopped where my father was digging a well and located a flow of water 30 ft. from the well. He did it with a forked peach-tree limb. Kid like, when he was gone, I procured a forked peach-tree limb, and found it worked for me even better than it had worked for him, as inside

half an hour I had learned that with certain movements of the wrist I could force it to turn any place I desired, even twisting the bark from the wood. That was more than forty years ago, and I have never since tempted fate by employing a forked limb of a peach tree to find anything. As to the effect of the moon I cannot answer, but the experiment was at a season of the year when the sap was flowing freely enough to cause the bark to slip easily from the wood.

Remembering this boyhood experience has afforded me a rich fund of humorous reading in the *Mining Journal-Press* doodlebug discussion. EXPERIENCE.

Joplin, Mo.

The Miner and the Land Office

THE EDITOR:

Sir—I neglected to send in my renewal, not because I did not want *Mining Journal-Press* or because it is not appreciated, as I would be lost without it. But I do wish that something could be done to help the mining game against this damnable state grazing and homestead act. If you know any way that we can battle them, I would like to have it published in *Mining Journal-Press*. In the last thirty days there has been a decision in Washington in favor of the grazer embracing four sections of mineral land that has been known as such since 1878, and part of it has been patented since 1885. (This is not allowed in the entry, but will be included in the fence that will be run.) Please inform me what can be done.

We have appealed to state officers, and they claim to have gone the limit for us. I am also interested in two claims that come under this act and am told that there is no mineral on my ground, when the smelter pays me for all that I ship. W. A. TRIMMER.

Hurley, N. M.

A Montana Relic

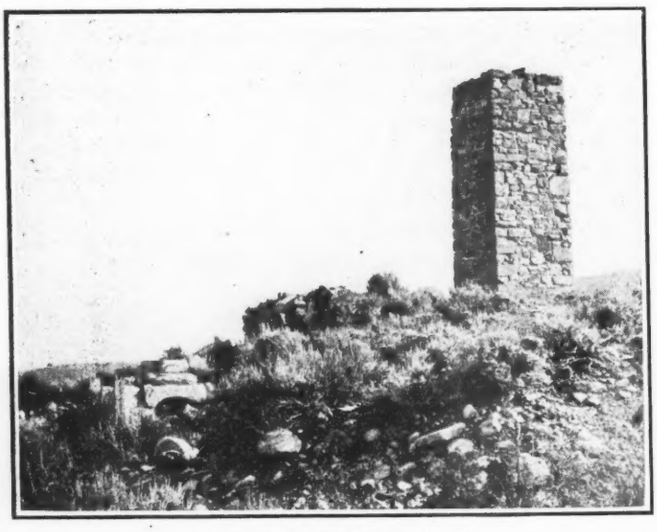
THE EDITOR:

Sir—Inclosed is a photograph that may be of interest. This picture was taken recently at Argenta, Mont., and shows the remains of what is locally reputed to be the first smelter built in Montana, erected in about 1865.

I know practically nothing about lead smelting, but this does not look like a smelter to me. It consists of a firebox, a large muffle, flue, and stack, and seems to me to have been either an assay furnace of large size, or perhaps a cupelling furnace. The muffle, which shows in the picture, and portions of the firebox and flue, are made of a soft volcanic-ash rock that is found in quantity a few miles away and which is of very poor quality for such purpose, the other rock in the structure being granite and quartzite. There is no slag dump, and this "smelter" is said to have been a failure owing to the inferiority of the ash rock as a refractory material; but near the base of the stack I found a piece of lead bullion with a half-inch layer of speiss on it. This bullion had been cast in a mold made in the ground, as there is gravel and sand sticking to the rounded bottom.

Within two miles are remains of four other lead smelters that were operated for short periods during the 70's, 80's, and early 90's. Only one of these was successful, it being operated for a couple of years by the late Senator Clark on ores from his own mines, and abandoned when the surface ores were exhausted.

Butte, Mont. ALEXANDER LEGGAT.



An early lead smelter?

Further Light on That Gold-Inlaid Saddle

THE EDITOR:

Sir—John J. Croston's letter in the Oct. 24 issue of *Mining Journal-Press* seems to offer several points for comment.

Many of us mining engineers have seen wire-gold ore and wire-silver ore. If we assume that such wire gold and wire silver are practically pure, $3,800 in such wire gold would weigh, "approximately," 13 lb. avoirdupois; and $200 in such wire silver, at 70c. per oz., would weigh, "approximately," 20 lb.; together, say, 33 lb. The weights of each (not "both") are not "approximately" equal.

As I recall it, when I was a cowboy, many years ago, a 30-lb. Mexican saddle, topped by a 180-lb. cowboy, was by no means a rarity; but, to add another 30 lb. or so to its weight would make it desirable (for the pony's sake) for the rider to weigh only about 150 lb., which was about my weight in those days; and my pony was far from being a "Gigantosaurus," in size.

Persons quite often make woeful errors when calculating (or guessing at?) the weight and value of gold and silver. W. DEL. BENEDICT.

New York City.

The Guggenheims in Control Again

THE EDITOR:

Sir—There is an undercurrent of feeling in this camp to the effect that there is some dire conspiracy to keep San Juan County out of the columns of your exclusive press. The theory is that as the McGraw-Hill Co. is a sort of technical literature trust, it must perforce be in league with G. Bros. It seems to be notorious out here that Senator G. got sore at the county officials some years ago, regarding some matter connected with Silver Lake mines. The proper thing would be to loosen up a wee bit of publicity, once in a while, just to prove an alibi for yourselves. You give the Anaconda company space regarding their International Smelting Co. doing things over the hill from us at Rico.

Did you know that the Tonopah Mining Co. was opening in this field, under the name of the Vertex Mining Co.? Do not confine yourselves to worshipping Mammon, as personified by the largest corporations.

Silverton, Colo. WILLIAM B. MCKINLAY.

Consultation

How Fast Can You Drive?

"Will you kindly advise at your early convenience what, according to your files, constitutes a record in rock drifting or crosscutting as far as distance traversed in a month and cost per linear foot are concerned? In connecting shafts on some of our properties we have been making a monthly progress of 500 to 600 ft. of drifting with an 8 by 8 cross-section in solid rock, and are wondering how this work compares with results obtained elsewhere."

The above query comes from the superintendent of a group of mines in Michigan. *Mining Journal-Press* will be glad to publish data from engineers who believe that they have creditable performances to record. The information should be of value to others who have similar work in hand.

In order that a fair comparison can be made, the following outline of the facts that are significant is suggested:

Name of mine.
Name of superintendent.
Location of mine.
Characteristics of rock.
Size of drift or crosscut.
Dates between which performance was made.
Number and kind of drilling machines used.
Average number of holes drilled per round.
Total number of rounds fired.
Kind and amount of powder used.
Distance advanced in period of thirty-one days elapsed time.

It is not essential that all of these data be given; or, if the correspondent cares to give other valuable details, we will publish them.

Treating Amalgamation Plant Scrap

Mark Lintz, of Terlingua, Tex., has submitted the following suggestion for treating scrap iron coated with precious-metal amalgam. The inquiry first appeared in our issue of Oct. 3.

These ideas are the outcome of my experiences in treating scrap iron containing a precipitate of silver, copper, and mercury.

The necessary equipment includes a tumbling barrel (one can be built out of 3-in. plank that will have a fairly long life); two plasterers' screens, one of ¼-in. mesh and the other ½-in. mesh; and a retort for distilling the mercury. This can be made out of a piece of 12- or 14-in. heavy pipe, 6 or 7 ft. long. Put a flange on one end and weld a head in the other end. A head to bolt into the flange can be made from a piece of ¾-in. sheet- or cast-iron. Drill a hole about 1-in. below the retort pipe and tap for a 2½-in. pipe; screw in a piece of 2½-in. pipe about 5 ft. long and bend down to about 45 deg. to set into a water seal, after the practice of the ordinary amalgam retort. This retort can be set in a hastily constructed brick furnace. Place the retort about 18-in. above the grates and burn wood, as the pipe would not last long over an oil burner.

If the material is already well corroded, I suggest that you put it through the tumbling barrel, first thing. This will clean the metallic surfaces and intensify the corroding process. Choose a well sheltered place to avoid the cooling action of the wind, make a conical pile of the material, and add about 20 lb. of sulphur per ton. Mix in the sulphur as the material is piled; then wet down the pile. If the pieces of iron are fine enough the reaction will be quite intense. Wet churn the pile about twice a day with hot water. (Cold water will retard the reactions.) If your scrap is very coarse it may be necessary to cover the pile with sacks and straw and admit steam in the bottom of the pile to drive the reaction. But in scrap finer than ¾-in. the reaction is intense enough to dry out the pile in four or five hours. Keep the pile wet until the sulphur has practically burned out, which will take about ten days. Then let the pile dry out and put the material through the tumbling barrel; screen out the scale, and, should the values remaining on the scrap warrant, give it a second or third treatment.

To recover the mercury, make an estimate of the amount of free sulphur and sulphide in the scale, and add a small excess of lime above the theoretical amount necessary to combine with the sulphur. If the lime is not added, the recovery of the mercury will present no end of difficulties, but with the lime present the mercury will distill over as prettily as from an amalgam retort. After the material in retorted, be careful in discharging the retorts. Keep the workmen provided with wet sponge respirators, as the traces of mercury left will produce acute mercurial poisoning (not serious but very inconvenient).

If you have facilities for melting down the scale, your recovery will be very satisfactory; but if the scale must be sent to the smelters it would be advisable to grind the material as fine as possible. Then take the screens and make three different lots of it, as minus ¼ in., plus ¼ in., and minus ½ in. Put each lot through the tumbling barrel for thorough mixing. By sizing and careful mixing the assays should check close enough for a satisfactory liquidation.

From Arthur Clare, mill foreman for the Hedley Gold Mining Co., Hedley, B. C., comes the following:

This scrap is always a bugbear to the millman. Having handled many tons of it when cleaning up, I found from experience that the following is a good method: Put the accumulation in a box and sprinkle it with coarse salt, moistening with water; add more scrap and salt until a box holding 150 or 200 lb. is filled. Moisten again with water, and the salt will soon dissolve the coating so that any amalgam or quicksilver can be released by grinding in a cleanup barrel.

Immersion of scrap in hot water at each cleanup will reduce to a minimum any amalgam remaining on it, so that after being decomposed with salt or sal ammoniac there should be no values to worry about. When cleaning amalgam, the use of hot water will thin amalgam so that fine magnetings may be extracted

with a minimum amount of gold remaining in the scrap. This may also be "salted" down for final treatment.

Fred G. Tyrrel, of Piedmont, Calif., offers the following advice:

The best method is amalgamation in a cleanup barrel such as is used for this purpose in California gold mines and to my knowledge in some other parts of the country. The cleanup barrel is simply an iron barrel of about 100-gal. capacity, set up on a framework and run by any convenient power. It is charged through a manhole, and has a ¾-in. tap hole for the discharge of the mercury when the operation is completed.

The barrel should be filled about half full of the battery iron, and water to about two-thirds. Then mercury—and plenty of it—is added. I have used as much as a whole flask at once, but in any case enough should be used so that it will run out through the tap hole without any amalgam hanging back after the operation is completed.

The manhole cover is put on with a rubber gasket, so that the barrel is water-tight, and the barrel is revolved for several hours, the time depending on the degree to which the iron is rusted together.

When finished, the iron is nicely polished, and the gold is all in the thin amalgam at the bottom. A bucket full of water is then placed underneath the barrel, and the barrel rotated so as to bring the tap hole directly over the bucket. In this way, the amalgam is tapped into the water without any splashing or loss, and the iron is left quite clean.

Analyzing Ores for Vanadium

"Can you give me a trustworthy method for determining the vanadium content of ores?"

The following method for making an analysis for vanadium is given by A. H. Low as a modification of a known method. In a former modification, published in Mr. Low's well-known text, a faulty theory in neutralizing the ferrous iron tended to produce high results. The revised procedure follows:

Weigh 0.5 gm. (or 1 gm. if of low grade) of the finely ground ore into an 8-oz. flask. Add 5 gm. of anhydrous sodium sulphate, 5 to 6 c.c. of strong sulphuric acid and about as much hydrofluoric acid as can be held in an ordinary platinum crucible cover (2 c.c). The hydrofluoric acid is advisable, although not always necessary. Heat over a strong free flame, with the flask in a holder, nearly to a melt. Allow to cool while distributing the mass around the sides of the flask. This prevents the solidifying cake from cracking the flask and also facilitates subsequent solution. It is best to use a Pyrex flask.

The treatment described will usually effect complete decomposition, but if it fails, try the addition of one-eighth of a 9-cm. filter paper at the outset. The organic matter must, of course, be entirely burned off.

When the flask is sufficiently cool, add 50 c.c. of cold water and 10 c.c. of strong sulphuric acid, and boil to dissolve everything soluble. Now add 5 c.c. of sirupy phosphoric acid and then, from a burette, run potassium permanganate solution into the hot liquid until a decided red color is obtained that persists after boiling again. Use the same permanganate as will be employed in the subsequent titration.

Transfer the hot solution from the flask to a 400-c.c. beaker and then dilute to about 200 c.c. with hot water.

Have ready a spot plate and place a drop of the ferricyanide solution in each of the depressions.

Using a small pipette, add the ferrous solution a little at a time to the hot liquid in the beaker, testing after each addition, until a drop of the vanadium solution, taken up on a glass rod and mixed with a ferricyanide drop, produces a blue color.

The ferrous solution first decolorizes the permanganate, then reduces the V_2O_5 to V_2O_4 and when finally in slight excess it shows a blue color with the ferricyanide. Try to avoid an unnecessary excess of the ferrous solution. The excess of ferrous salt must now be oxidized to ferric. Run the regular permanganate solution in from the burette until the ferricyanide test fails to develop a blue tinge after standing about half a minute. This should be done as carefully as in a regular titration, as faint tinges of color develop slowly and should be waited for. Toward the last the permanganate should be added a drop at a time.

When the oxidation of the ferrous salt is complete, titrate the still hot liquid with standard potassium permanganate solution until a faint pink color is obtained that after persisting for about a quarter of a minute, perhaps, changes to a faint brown. As a check, the solution may be again heated, the reduction and complementary operations repeated, and titrated once more.

With a permanganate solution containing 1.737 gm. per liter, 1 c.c. = 1 per cent V_2O_5, when 0.5 gm. of ore is taken for the determination. Standardize it against about 0.125 gm. of sodium oxalate (Sorensen's salt). The percentage value of 1 c.c. in sodium oxalate multiplied by 0.7612 will give the percentage value in V, or, multiplied by 1.358, the percentage value in V_2O_5. The permanganate ordinarily used for iron is rather strong for accurate work; its iron value multiplied by 1.63 will give the V_2O_5 value.

The addition of phosphoric acid, as described, materially sharpens the end point of the titration, especially in the presence of uranium.

In this method just the following special solutions are required:

A dilute solution of potassium ferricyanide: about 50 mg. dissolved in 100 c.c. of water.

A 20 per cent solution of ferrous sulphate or ferrous ammonium sulphate.

Cost of Crushing on a Large Scale

"What is the cost of crushing copper ores in large western concentrators?"

At the Magma plant of the Utah Copper Co. near Garfield, Utah, the coarse-crushing unit has a capacity of 24,000 tons of run-of-mine steam-shovel ore per day. The following per-ton costs, however, were made when crushing only a moderate tonnage to pass a ¾-in. ring. Overhead expense is not included.

Operating labor	$0.01053
Car dumper	0.00072
Crushers	0.00294
Feeders and conveyors	0.00747
Screens	0.00173
Secondary rolls	0.00737
Electric power	0.00828
Total	$0.03904

News of the Week

The Mining News of ENGINEERING AND MINING JOURNAL-PRESS is obtained exclusively from its own staff and correspondents, both in the United States and in foreign fields. If, under exceptional conditions, material emanating from other sources is published, due acknowledgment and credit will be accorded.

Summary

TRI-STATE ZINC and Lead Ore Producers' Association holds meeting at Picher, Okla.; wants harmony with and co-operation of zinc-smelting interests. Cavern Lead Co. completes mill in seventeen days.

Daly Mining Co. may purchase Calumet & Jerome property; makes offer of $200,000 for treasury stock—Moctezuma Copper Co. leads Phelps Dodge groups in safety contest.

Ore production from Minnesota State lands exceeds that of 1924. Hull-Rust mine used as feature scenery in "The Man of Iron."

American Mining Congress asks repeal of capital stock tax and retroactive paragraphs in Section 204 of income tax law.

Linforth predicts long life for Butte mines. Jardine pays small dividend.

Marquette County, Mich., has low accident rate—Cleveland-Cliffs Co. to erect crusher at Negaunee—Homer mine case settled out of court.

Ontario gold to be coined for producer. Vipond and other companies enlarge milling facilities. Kirkland Lake discovers ore on 2,000 level.

European iron and steel industry below normal. U. S. Smelting & Refining Co. issues $8,000,000 ten-year notes.

Florence Goldfield Mining Co. wins suit in case of Nevada Florence Exploration Co. canceling the latter's lease.

Bureau of Mines Advisory Committee holds report in abeyance. Next meeting at Washington in November.

Successful financing of White Caps stimulates Manhattan district, Nevada.

Zinc Miners Desire Co-operation of Smelting Interests

Fifteen Directors Elected for the Coming Year

Zinc-ore producers in the Joplin-Miami district are ready to meet with the smelting interests to eliminate any differences that exist between these two factions of the industry, and to promote a spirit of harmony and mutual co-operation. This is the declaration of J. F. Robinson, of Miami, president of the Tri-State Zinc and Lead Ore Producers' Association, at the annual meeting, held recently at Picher, Okla.

It was maintained by Mr. Robinson that the smelting interests are not justified in unfriendliness toward the Ore Producers' Association on the score that it was formed for the purpose of furthering illegal combinations against the smelting interests. He declared the mining interests want only what is fair.

CONTRIBUTIONS TO DATE, $64,000—FUND TO BE KEPT INTACT

The matter of disposing of the fund raised for the purpose of advertising zinc came before the association, but nothing definite was decided. Mining firms have raised about $32,000, and business interests an additional sum of approximately the same amount. It was voted to keep this fund intact in the hope that the smelting interests will yet raise the $50,000 that was at one time accepted as their quota. The Ore Producers' Association collects 25c. for each ton of zinc and lead concentrates produced in the field, and one-fifth of this amount is budgeted to advertising. It was left to the board of directors to decide whether this 5c. levy shall continue to be made or to be eliminated.

Directors elected for the coming year were P. B. Butler, Frank Childress, C. F. Dike, S. H. Davis, H. M. Harrison, F. H. Kissling, W. L. Landrum, Charles Neal, M. F. Owens, Walter Ragland, J. F. Robinson, C. F. Wallower, F. M. Woods, George Pearson, and T. F. Coyne.

Inspector's Report for Marquette County Shows Progress in Safety

THE report of the mine inspector for Marquette County, Mich., which comprises all of the mines on the Marquette iron ore range with the exception of one property, shows only two fatal accidents for the year which was brought to a close Sept. 30. It was the most satisfactory report, from a safety standpoint, ever issued in the county, the fatality rate for the twelve months being only .59 for each 1,000 men employed, as against a rate of .88 for the year 1922, the best previous record.

The inspector's report shows eighteen operating mines, with five quarries listed. The number of men employed, underground and surface, was 3,361. This is approximately the same as for 1924. During the year one old mine was reopened and one property usually worked during the summer months was idle.

Iron Ore Production From State Lands Exceeds That of 1924

Output Equals 72,000 Cars—Hull-Rust Mine Used in Movie Scenario

The 1925 output from state-owned mines on the Mesabi range has already passed the total for 1924 and may equal the high mark of 1923, when over 7,500,000 tons was shipped. The heaviest producer is the Missabe Mountain mine, at Virginia, Minn., followed by the Hill Annex mine, at Calumet, with the Leonidas mine, at Eveleth, third in production. The royalty payment for these three mines for July, August, and September is close to $750,000, and with the production of the smaller mines will total $900,000. The 3,600,000 tons shipped would form a train 300 miles long and fill 72 000 ore cars. This money is placed in permanent trust funds of the state in the following proportions: 87 per cent is for public schools, 11 per cent for the reclamation of swamps and 2 per cent for the university.

Several blocks of iron ore totaling close to 100,000 tons have been recently sold on the range. It was necessary for the La Rue mine, at Nashwauk, to put on a night as well as day shift to get out an additional 20,000 tons, while the Mesaba Cliffs Iron Co. has purchased the old North Eddy stockpile, of 20,000 tons, and has a shovel busy there loading it out.

The Mesabi range is being used for the production of romance as well as iron ore. The Milton Sills Movie Corporation has used the Hull-Rust pit at Hibbing in some of the scenes for the play "The Man of Iron."

U. S. Smelting Issues $8,000,000 Ten-Year Notes

The United States Smelting, Refining & Mining Co. is offering a new issue of $8,000,000 ten-year 5½ per cent gold notes at 99 and interest, to yield about 5§ per cent. For the nine years ended Dec. 31, 1924, average net earnings available for interest after taxes, depletion, and depreciation were about eleven times the interest requirements on these notes. Proceeds of the issue, together with other funds on hand, will be used to retire at or before maturity $12,000,000 6 per cent convertible gold notes due Feb. 1, 1926. After retirement of the convertible notes the present issue will constitute the only funded debt of the company.

Florence Goldfield Wins Suit and Cancels Exploration Co.'s Lease

The Federal Court at Carson City, Nev., recently handed down a decision in the case of the Nevada Florence Exploration Co. a leasing company, against the Florence Goldfield Mining Co., denying the application for an injunction and permitting the cancellation of the Exploration Co.'s lease.

The operations at the Florence Goldfield mine, at Goldfield, Nev., have been suspended since last February on account of this litigation, which arose over a dispute between leasors over a rich strike made in conflicting leases held by the Exploration company and one Biltoft, a local leasor.

A surrender of the Biltoft lease was secured by the Florence company and the lease to the Exploration company was canceled by the forfeiture upon the denial of the injunction by the court.

The Florence Goldfield company now controls all of its ground and is planning to operate extensively on company account and to undertake exploration.

Ontario Gold to Be Minted for Producers

The gold-mining companies in northern Ontario are being advised by G. C. Bateman, secretary of the Ontario Mining Association, of arrangements just completed with the mint and the Department of Finance regarding the refining and melting of gold at the Ottawa Branch of the Royal Mint. Under the royal proclamation establishing the mint, any person was at liberty to bring gold to the mint and have it minted into coin. It naturally followed that Ontario producers could ship their gold to Ottawa and have it minted into gold coin, which could be deposited in the banks, at par. The details of this have now been worked out by the association, with the mint and the Finance Department, and producers are being advised that they can send their gold to Ottawa. The saving on express and refining charges is estimated at approximately $50,000 a year, and this saving will be very largely increased through the discount on American funds. At the present time American exchange is at $\frac{5}{32}$ discount and each $\frac{1}{32}$ discount represents $10 000 a year, at the present rate of gold production.

Cleveland-Cliffs Iron Co. to Erect Crushing Plant at Negaunee

The Cleveland-Cliffs Iron Co. will this winter erect a new crushing plant at its Maas mine, at Negaunee, Mich., on the Marquette range. It will replace a plant now in operation but which is inadequate for present needs. The new plant will be designed primarily to handle the hard siliceous iron ore being mined at the Ogden property, reopened last spring after a long period of idleness, but will also treat some of the ores coming from other mines.

Daly Mining Co. Makes Offer of $200,000 for Calumet & Jerome Co.

Representatives of the Daly Mining Co. are said to have made an offer of $200,000 for the entire treasury stock, consisting of 615,000 shares, of the Calumet & Jerome Mining Co., of Jerome, Ariz. The authority for the statement is James O'Brien, a representative of the Daly firm, who visited the Jerome property recently.

If the transaction is closed it is planned to deepen the shaft at least 500 ft. and to drive cross-cuts at this level to the 101, 102, and 103 claims, in which the Calumet & Jerome has a two-thirds interest. These claims are near the United Verde Co.'s Venture tunnel, where development work during the last year has disclosed a considerable amount of chalcopyrite.

Cons. Min. & Smelting Co. to Erect a Second 400-Ft. Stack

The large smokestack and Cottrell fume precipitating plant in the zinc department at the Trail, B. C., smelter has been completed and put into operation. The company has let a contract to the Rust Engineering Co., of Pittsburgh, for another stack of similar height, 409 ft., which is to take the place of the two stacks now in use in the lead and copper departments at the smelter. This stack will have an inside diameter of 40 ft. at the bottom and 25 ft. at the top, and therefore will be appreciably larger than the stack in the zinc department. The foundation will be put in this fall.

Canadian Lorrain Issues 700,000 Shares Treasury Stock

The directors of the Canadian Lorrain, operating in northern Ontario, have decided to issue 700,000 shares of treasury stock to raise funds to pay off an indebtedness of $125,000 to the Huronian Belt Co. and to enable the company to reach the producing stage at an early date. The shares will be issued at 50c. per share, and will be offered to present shareholders at the rate of 35 new shares for every 100 shares now held. The Huronian Belt Co. has guaranteed a minimum subscription of 350,000 shares and is given the right to subscribe at any time before Oct. 31, 1926, for any shares not applied for under the present offer.

W A D Syndicate Completes 383 Ft. Shaft

H. A. Wentworth, of the W A D syndicate and president of the Central Manitoba Mines, Ltd., has returned from a visit to the mine property, in the Long Lake-Bulldog Lake area of Manitoba. The three-compartment shaft has been completed for the present at a depth of 383 ft. The crosscut south at the 125-ft. station encountered the vein approximately 60 ft. long from the shaft, and 190 ft. of drifting has been accomplished. Where the vein was encountered in the crosscut it was 13.5 ft. wide, carrying ore of excellent grade. A station has been cut at the 250 level. Fifty tons of ore is being hoisted daily.

Linforth Predicts Long Life for Butte

Many predictions have been made as to the ore reserves in Butte and the life of the mines. The most recent is by F. A. Linforth, who addressed the Kiwanis Club of Butte on "The Geology of The Butte Hill." Mr. Linforth has been connected with the geological department of the Anaconda Copper Mining Co. for over thirteen years and now holds the position of assistant chief geologist. His address, given in terms that any layman can understand, contained this statement: "There is no one who could come near setting the future in years—it is foolish to attempt it. Some of the best ore is being found at greatest depths. We have 3,000-3,200- and 3,400-ft. levels producing the highest-grade ore, and we have developments at the 3,800 showing the same copper streaks and these can be worked as time demands. Not alone do we depend on our present mines. To the north, west, and east there is much terrain still to be prospected. As long as we have great expanses of development to do we can be sure that for a long, long time we can still say 'Butte is the richest hill on earth.'"

Federal Mining & Smelting Co. Reopens Page Mine

The probability of opening up an extensive shoot of lead-silver ore, together with the demand for zinc, has induced the Federal Mining & Smelting Co., of Wallace, Idaho, to reopen the old Page (Corrigan) mine, near Kellogg, in the Cœur d'Alene district. This property was developed many years ago to the extent of a shaft 600 ft. deep, from which the vein was explored on several levels, resulting in the development of considerable zinc and lead-silver ore, the former predominating. The flotation process has made possible the recovery of both zinc and lead.

The Federal company has installed electric power, a compressor, a pump, and other needed equipment, restored buildings, and retimbered the shaft for a considerable distance below the collar.

Unwatering the mine was completed a few weeks ago, and crosscutting has been started to the parallel vein. In the meantime the old workings are being investigated.

Washington News

By Paul Wooton
Special Correspondent

Repeal of Capital Stock Tax and Retroactive Paragraphs of Section 204 Asked

Tungsten Producers Active in Tariff Matters—Commission Calls for Data Regarding Graphite

Repeal of the capital stock tax—held to bear much more heavily on metal mining than on manufacturing—was urged before the Ways and Means Committee last week by representatives of the American Mining Congress. It is the position of the Mining Congress that the tax should be abolished outright and not commuted into an increase of the corporation tax.

The capital stock tax, it was contended, is a war measure projected inexcusably into peace time. It was characterized as being in violation of the canons of just taxation in that it bears more heavily on the weak than on the strong. It puts an unnecessary burden on the processes of production and necessitates $20,000,000 worth of needless bookkeeping annually, it was declared on behalf of the Mining Congress. Moreover, its levy has to be arbitrary as it would cost the government more than it collects from the tax to conduct revaluations annually.

The committee also was asked by the Mining Congress to amend paragraphs 7 and 8 of Section 204 so as to eliminate its retroactive features. To do so the Mining Congress contended before the commitee "will have negligible effect on the revenue, but will free many reorganizations which were consummated under the old law from the cloud and embarrassment of these retroactive provisions. These clauses in the law are of doubtful legality as offending the Constitution. Many organizations within the scope of Section 204 were undertaken not only without consideration of taxes but under compulsion of judicial mandate. Particularly will these retroactive provisions, if not repealed, be unjust, as they affect stockholders who were not parties to the transfers affected, but who acquired their stock later at its appreciated value in reliance upon the law then in force."

Tungsten Producers May Ask for Higher Tariff

Evidence of activity in behalf of producers or potential producers of tungsten has become manifest in Washington. Whether the intention is to attempt to amend the tariff act so as to increase the duty on tungsten or the plan is to induce the Tariff Commission to increase the duty under the flexible provisions of the law has not been revealed. Whichever line the activity takes it is believed that the attempt is foredoomed to failure, as the chances are much against any opening of the tariff at the coming session.

In so far as the Tariff Commission is concerned, it seems hardly likely that an increase will be granted on a commodity now enjoying a duty of $7.14 a unit when it is considered that the British price is less than $2.50 a unit. This rate of duty is equivalent to an ad valorem duty of 285 per cent. More than three years of this amount of protection has brought forth little domestic production. Colorado, which was to become a large producer under the existing high duty, has no single property in operation. Even the Atolia mine is being worked by tributers, although the company is milling the ore the lessees produce. Some production is coming from the property at Bishop, Calif., but two mines in Nevada, slated as being active, are engaged in development work only.

Tariff Commission Seeks Data Regarding Graphite

Users of graphite have received a questionnaire from the Tariff Commission intended to establish the amount of graphite consumed in different uses. Despite all of the consideration and discussion of graphite during recent years, it seems that no government agency has even approximate figures as to the amount of graphite used in batteries, in lead pencils, in crucibles, in pigments, and the various other purposes.

Tariff Commission Concluding Investigation of Pig Iron

The Tariff Commission is concluding its investigation of pig iron. Domestic field work has been completed. The present duty of 75c. per ton allows Indian pig iron to invade our seaboard points, although the margin is insufficient to permit of its transportation into the interior.

Bureau of Mines Committee Not Ready to Report—Next Meeting in November at Washington

No publicity is to be given the findings of the subcommittees studying the work of the U. S. Bureau of Mines until final action shall have been taken on them by the whole advisory committee. An agreement to that effect was adopted by the committee at its Pittsburgh meeting last week. Frequently discussion by the full committee has cleared up questions which have been raised by individual members. Chairman Reynders requested that the members of the committee withhold information for the present as to the discussions at the Pittsburgh sessions.

Another meeting of the committee is to be held early in November in Washington. It is known that every effort is being put forth to expedite the work of the committee, as the reorganization of the Bureau may indicate to Congress that the mining industry is prepared, through that agency, to do voluntarily some of the things which certain legislators would make compulsory. While the only drastic legislation likely to be proposed at this session of Congress will apply to coal, it is recognized that the prescribing by law of a program of returns which must be made by coal producers would establish a precedent which soon would be applied to iron and steel, lumber, and other commodities entering into general use.

Reclamation Bureau Demands Pay for Services Rendered

The Secretary of the Interior and the Commissioner of the Bureau of Reclamation figuratively will come before the bar of the next Congress for a vote of confidence. These officials have essayed to follow a bold policy with regard to relief and collections on federal reclamation projects. The opposition has crystallized definitely and apparently nothing can prevent a clear-cut determination of the issue involved.

Secretary Work and Commissioner Mead will insist that Congress support them in their opposition to moratoriums and any form of blanket relief, or that refunds be made to those who have paid, so that equality of treatment may be accorded to all. They will not be parties to any policy which writes off the debts of those who have made no effort to pay and who are able to pay. They are ready to meet in a finish fight those members of Congress who are giving support to agitators who are striving for the postponement or the forgiving of debts. It will be brought out clearly that the fundamental question involved is whether the Bureau of Reclamation is a political or a business institution.

Underground Mining of Limestone

Limestone, which finds industrial use in the United States to the extent of approximately 120,000,000 tons per year, is obtained chiefly from openpit quarries, but with gradual depletion of surface deposits, more and more operators are being forced to use underground methods. As quarrymen are not necessarily familiar with underground mining, a complete study of the mining of limestone in this manner has been made by engineers of the U. S. Bureau of Mines, with the object of determining the methods in use, ascertaining what constitutes good and bad practice, and suggesting improvements in methods when practicable. As a result, complete data were obtained, with the hearty co-operation of the industry, on 52 of the 64 mines known to have underground workings. The information obtained by the Bureau will be embodied in publications to be issued within the comparatively near future.

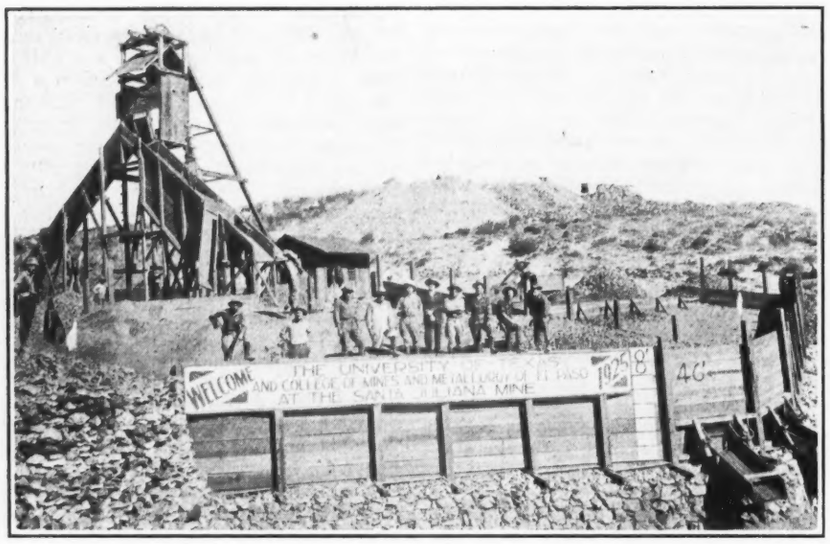
Brick Manufacturers Utilize New Automatic Machinery

The brick manufacturers have added materially to the elimination of waste. Automatic machinery has been devised which places a veneer of barium-treated clay on untreated clay in the making of bricks. The addition of barium to certain clays is necessary to prevent efflorescing. Until recently the whole brick was made of barium-treated material. With the new machinery only 10 per cent of the clay has to be thus treated, thereby reducing considerably the cost of the product. The new machine also makes it practicable to place feldspar surfacing on bricks. This opens a new market for albite.

Students of Texas School of Mines Spend Month in Chihuahua

The School of Mines and Metallurgy of the University of Texas, at El Paso, each year takes a class of its mining students into Mexico. This year the class visited Santa Juliana mine, at Sabinal, Chihuahua, where the party remained a month, studying geology and making detail maps of the property, which has been turning out lead, zinc, and silver for forty years. Both surface and underground surveys and maps were made, and many interesting things about mining and engineering were seen and studied first hand.

"As far as I know, the Texas School of Mines is the only one in the United States which goes outside of the country on a study trip of this kind," said Prof. H. E. Quinn, director of the party. "Many of our students look to Mexico as their future location; hence the desire of school authorities to teach them the practical as well as the theoretical side of mining in Mexico. We received the best of treatment on our journey, and have nothing but praise for people and conditions in northern Mexico."



Santa Juliana mine, visited by students of University of Texas

Sabinal is on the Mexican Northwestern Railroad, but the mine is 15 miles from the line. The Texas School of Mines is growing and has an enrollment of nearly a hundred students from the southwestern states and Mexico.

Promontorio Mine May Get Railroad

The Promontorio mine, east of Tepache, Sonora, Mexico, owned by the Moctezuma Copper Co., has been under lease during the last year to Nicolas Velarde. Though several carloads of ore have been shipped, the work was held back for lack of pack animals, on account of drought. Owing to its distance from the railroad at Nacozari—85 miles—no effort has been made to exploit the mine. In 1915, about 10,000 tons of ore was shipped to the Copper Queen smelter.

Walter Douglas is making an examination of the mine, and it is possible that the Moctezuma Copper Co. may start work soon. In this event probably no more ore will be shipped until the Nacozari-Tonichi branch of the Southern Pacific is completed. It is expected that work will be started on this branch during 1926. The new line passes within 10 miles of Promontorio.

Mining Men to Deliver Lectures at Arizona University

Dean Butler of the University of Arizona has obtained the consent of a number of mining men to deliver lectures before the students of the engineering college during the winter. The lectures will be given once a month and will consist of a technical lecture in the afternoon and one of general interest in the evening. Among those who will appear before the college this year are G. H. Dowell, manager of the Copper Queen mining company; H. W. Aldrich, assistant general manager of the Inspiration company, and Orr Woodburn, director of the Globe-Miami mine rescue station. A similar and very successful series of lectures was given last year at the university.

Moctezuma Copper Co. Leads in Phelps Dodge Safety Contest

The Moctezuma Copper Co., of Nacozari, Mexico, ranks first, and the Copper Queen Co., of Bisbee, Ariz., second, among the four Phelps Dodge properties in the corporation's safety-first contest for the period extending from July 1 to Oct. 1, according to a report issued by the safety department. The Morenci branch ranked third and the Old Dominion, of Globe, fourth. The properties are graded according to time lost on account of accidents.

Each branch has been divided into seven divisions: Underground mining, surface mining, crushing and concentrating, smelting, mechanical and shops, miscellaneous surface departments, and all other departments. Only those accidents in which an employee is forced to remain off duty for a time are counted in the contest.

San Nicolas Mine Closes for Repairs

Stoping and milling operations at the San Nicolas mine, south of Cumpas, Sonora, Mexico, have been stopped, pending development in the mine and repairing the mill. A compressor is being installed and air drills put in for further development and stoping. The mill has worked only intermittently, owing to lack of water during the last season.

About a year ago a good vein was encountered on the 400 level, but it was impossible to exploit this ore to any extent, owing to shortage of water at the mill. Steady milling was resumed in July with the summer rains, and in September a large car of concentrates assaying about 1,000 oz. per ton was shipped.

Sintering Machine Patents in Legal Controversy

In the U. S. Ninth Circuit Court of Appeals at San Francisco, John E. Greenawalt presented on Oct. 16, 1925, an appeal from an adverse decision given by the U. S. district court of Montana in his suit against the American Smelting & Refining Co. in which Greenawalt alleged infringement of certain features of his ore sintering device. The American Smelting & Refining Co. won the suit, and an appeal has been taken. The point at issue involves the igniting device in use upon the Dwight-Lloyd sintering machine. This consists of a muffle or hood in which an oil or coal-dust burner discharges its flame, igniting the ore bed upon the pallets of the sintering machine.

Greenawalt contends that the use of the device is an infringement upon his patent, which included an open-bottomed, closed-top hood for igniting an ore bed preliminary to roasting and sintering. Both sides to the controversy were each given an hour before the court and explained by the use of models the important features of each igniting device. It is of interest to note that both the *Mining and Scientific Press* (Jan. 13, 1909) and the *Engineering and Mining Journal* (Dec. 31, 1911) were quoted by the attorneys in delving into the history of sintering practice. Both parties to the appeal presented briefs in support of their contentions. A. S. Dwight, R. W. Lloyd, and John E. Greenawalt were in attendance at the session of the court.

Gibson Cons. Copper Co. Faces Foreclosure

The Old Dominion Commercial Co. filed a mortgage foreclosure suit at Globe, Ariz., recently against the Gibson Consolidated Copper Co., one of Gila County's big producing mining companies of several years ago. The amount of principal and delinquent interest is more than $200,000. The suit is the outgrowth of other suits that have been instituted against the inactive property during the past few years. The company owns 300 acres, with about 26,000 ft. of development.

The Giant Ledge Syndicate Developing Property at Murray, Idaho

Formerly a Gold Producer, Now Promises to Be a Lead-Silver Mine

By R. G. McPhee
Spokane, Washington

The most important new development near Murray, Idaho, is at the Giant Ledge mine owned by the Giant Ledge Syndicate, an Idaho corporation with offices at Troy, Idaho. The Giant Ledge is one of the oldest locations in the district and has produced some gold from early days placer mining. Several efforts have been made to develop the property and although a big ledge was opened no commercial ore was encountered and work was abandoned five years ago.

About two years ago a group of men from Lewiston, Idaho, became interested in the Giant Ledge and organized the Giant Ledge Syndicate to take over the property. The syndicate installed new machinery and spent nearly $100,000 in searching for the ore on the 400-level and was about to abandon all efforts when a cave-in revealed the location of the ore. The cave took place last March and since that time, by crosscutting, the Giant Ledge has proved definitely that the main ore shoot is at least 1,800 ft. long. The entire vein is not of commercial grade. At the west end of the 400-level a raise is being driven under the old gold shoot, and stringers of low-grade gold ore are appearing in the back. In this same level there is also a lead-silver deposit that appears to be separate from the main vein. Recently the Giant Ledge management placed a crew at work drifting west through virgin ground in the direction of the main ore-shoot. After drilling and blasting three rounds the miners broke into a mineralized zone 18 ft. in width on the contact of the quartzite with an igneous dyke. A sample across the face of the drift assayed $15 in lead and $3 silver.

The 200-level is in the St. Regis quartzite, and there is practically no shearing that can be noticed, while the 400-level is in a shear zone in the Revett quartzite, the same formation in which the Morning mine of the Federal company has opened up large silver-lead deposits. The Revett formation is generally from 800 to 1,000 ft. in thickness and underneath it is the Burke formation (about 1,000 ft. in thickness), an even more favorable quartzite for lead-silver ore. Beneath the Burke is the Pritchard slate. The Giant Ledge workings have entered the Revett in a shear zone.

The company is now planning to sink a three-compartment shaft to the 1,000-ft. level and cut stations and drift on various levels. It is believed by those who have examined the mine that at an additional depth of from 200 to 400 ft. the three veins on the Giant Ledge will unite and form a large deposit of silver-lead ore.

There is now in sight at the Giant Ledge sufficient commercial lead-silver ore to operate a 100-ton flotation unit for three years without further development. The flotation unit is now under construction and will be ready for operation by Jan. 1, 1926. The flow sheet for the mill, and preliminary experimental tests of the ore, have been made by R. S. Handy, metallurgical engineer.

Before sinking is started a geological survey of the property will be made by Oscar Hershey. In developing the Giant Ledge the syndicate has expended $250,000. In the past $500,000 had been spent in mine development. The company owns 65 claims and has seven claims, located on the vein, in process of patenting. There is a power site which is capable of furnishing all the power necessary and any excess power can be sold to the adjoining Cedar Creek mine. Water for the mill, all the year round, can be impounded by building a dam across another creek in the vicinity of the Giant Ledge property.

Transportation is easy. The mine is nine miles from the railroad at Pritchard. Originally the railroad was at Raven, just a mile away, but, due to the operations of the Yukon Gold dredge, the Union Pacific company tore up their tracks some years ago. The grade still remains, except in a few places, and it would take but a short time to restore the grade and lay steel to Raven. The mine is about 40 miles by rail from the Bunker Hill smelter. From the Giant Ledge to the upper tunnels of the Hercules it is scarcely a mile by airline, and to the Callahan company's zinc-lead mine it is but little more than two miles. The Tamarack is about three miles southeast of the Giant Ledge. Development of the Giant Ledge is being followed with great interest, for many think that Giant Ledge will be the next great mine in the Coeur d'Alene district.

First 100-ton unit, Giant Ledge mill

Giant Ledge shaft and tram to mill

Successful Financing of White Caps Co. Stimulates Manhattan District

Since the successful financing of the White Caps mine, in the Manhattan mining district in Nevada, there has been renewed activity in the camp and considerable development. In the White Caps mine the footwall drift on the 1,220 level has cut what is believed to be the west part of the east orebody, which was developed on the 1,120 level, and a drift is in ore assaying $45 per ton.

It is reported that Thomas F. Cole and associates, of New York, have extended financial assistance to the Manhattan Amalgamated and that a definite and extensive plan of development will soon be started.

The High Divide Mining Co., one of the Divide district companies organized about 1919, has optioned a group of claims on the northern gold belt and has made the initial payment. The High Divide company is controlled by the Brougher interests. Development work is to be started soon.

Prince of Wales Mine Ships $57 Ore

The last shipment of ore from the Prince of Wales mine carried 78 ounces of silver, 2 per cent copper and 28 per cent lead and netted the company after royalties, hauling, and all other charges a total of $1,994.24 or approximately $57 a ton. The mine is in the Big Cottonwood district near Salt Lake City, and was opened over fifty years ago by Marcus Daly. The total income derived from this mine is more than $1,250,000. For about eight years, the Alta Tunnel and Transportation Co., which has a lease on the property in addition to ownership of surrounding claims, has been running a tunnel to expose the downward continuation of the Prince of Wales vein, persistently productive for a depth of 800 ft. on its dip.

Two headings are being run. A winze has been sunk 220 ft. from the Annie tunnel on an eight-inch vein of high-grade silver-lead ore. A raise is being made to connect with the winze sunk from the Annie tunnel of the Prince of Wales mine. About 300 ft. of the intervening distance of 775 ft. has been covered. Officials estimate that a considerable tonnage of ore has been blocked out on three sides.

Canterbury Drainage Tunnel Now 2,700 Ft. Long

The Canterbury tunnel, the Leadville (Colo.) drainage and development project, which is a community enterprise, has penetrated 2,700 ft. with the breast now in blue limestone. Ore is not expected until the apex of the Canterbury hill uplift is passed. In the meantime the water flow from the tunnel is 4,000 gal. per minute, thus benefiting the area to be drained.

A raise from the crosscut driven to prospect the Minneapolis area is in flint of identical character to that which was the bedding plane of the famous Fryer Hill orebodies. The thickness of this flint is about 58 ft.

Nitrate Deposit in Wyoming Leased to W. D. Turner

The first application for a lease on sodium nitrate deposits in Wyoming was filed recently by W. D. Turner, of Kansas City, through his attorney, John D. Dawson, of Glenrock, Wyo.

An investment of nearly half a million dollars is contemplated on the development of one of the largest nitrate deposits in Wyoming, Dawson states in his application, and of this amount $30,000 has already been expended on general investigation, engineering work, and the analysis of rock samples.

The lease covers five sections of land 14 miles south of Glenrock, on Little Deer Creek.

Cavern Lead & Zinc Co. Completes Mill in Seventeen Days

What is reputed to be a record for mill building in the Joplin district was established recently when the Cavern Lead & Zinc Co. completed a new mill and produced a car of lead concentrate within seventeen days after construction work was begun. Foundation work on the mill was started on Sept. 23. The first lumber for the mill was delivered to the grounds the following day, and the first delivery of machinery was made on Oct. 5. The mill was "turned over" on Oct. 10. The mill is electrically driven and of 150 tons daily capacity. It is on the Chestnut tract, near Crestline, Kan., and is owned by W. J. Martin and F. R. Bouldin and associates, of Miami, Okla.

Homer Mine Case Settled Out of Court

The Homer mine case, which was in a circuit court in Michigan for almost two years, has been settled satisfactorily out of court, and the court's decision will be withheld.

Suit was brought by the fee owners of the Homer iron mine to compel the Buffalo Iron Mining Co. to pay damages because of alleged improper mining methods. It was contended that much ore had been lost and that the recovery was not what it should have been. The trial was a long one, with many expert witnesses employed by both factions.

The terms of the agreement, which was deemed a decisive victory for the fee owners, include the payment of the costs of the case, set at $15,000, an increase of 3c. a ton in the royalty, and an increase in minimum royalty from $4,000 to $15,000 annually. The terms also provide for a twenty-year extension of the lease. Underground mining methods have been changed. The ore is now being extracted by the top-slicing method instead of by open stopes. Fifteen per cent more ore is now being recovered than formerly.

Aluminum Company to Install Ten 80,000-Hp. Turbines

E. S. Fisk, vice-president of the Aluminum Company of America, states that the company's Canadian plants at Chute a Caref will be completed and in operation by the end of 1926. He forecasts an initial payroll of 8,000. Preliminary work has been completed, and a temporary transmission line from Grande de Charges is being strung to supply power pending completion of the Chute a Caref plant.

At Chute a Caref, ten turbines of 80,000 hp. apiece are to be installed. These will be the largest in the world, the government hydro service states, the largest now in operation being only 55,000 hp. Bids for these machines, which will cost about $1,000,000 each, are now being sought, and at least one Canadian concern is bidding.

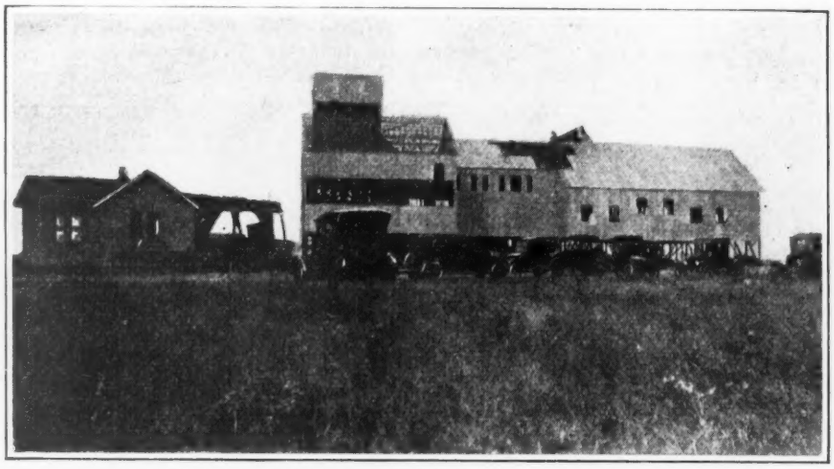
Siskiyou and Placer County Mines Active

The J. Nelson mine, near Orleans, on the Klamath River, Siskiyou County, Calif., has been purchased by J. McKendrick of Pasadena, Calif., for a reported price of $30,000. Homestake mine, on Taylor Creek, in the Salmon River area, has been leased to a Canadian mining syndicate represented by A. T. Manning of Seattle. Wolverine mine, south of Hornbrook, on the Klamath River, has been purchased by the Globe Mining Co. of Los Angeles. At Lewiston, Trinity County, E. L. Smith, manager of the Trinity Dredging Co., has sold his interest to Miss Mary E. Smith. The company is building a new dredge. It is expected that it will be in operation by the beginning of 1926.

United Verde Extension's Tax Suit Tried in San Francisco

The appeal of the United Verde Extension Mining Co. from a dismissal ordered in Prescott, Ariz., last March, by United States Judge Jacobs, was presented before the Federal Court in San Francisco recently. Assistant Attorney-General A. R. Lynch represented the state and P. W. O'Sullivan, Yavapai County.

The plaintiff seeks to overthrow the present Arizona system of taxing mines on production and profits as well as on physical valuation. It has deducted $546,000 from its tax bill this year, and has paid the collector the balance, on account, asserting excessive and unfair valuation.



Tri-State Mining Co.'s 350-ton mill under construction near Cardin, Okla.

Copper Queen Smelter Work Delayed Pending Revised Plans

Construction work at the Copper Queen smelter in connection with the extensive improvement project being carried out has been halted temporarily, due to a change in the plans. As soon as the new plans are drawn up work will be resumed. About 150 men are now employed on the project.

The Dwight P. Robinson Construction Co., with Western headquarters in Los Angeles, is doing the improvement work, and G. D. Neville is acting as superintendent of construction. The actual construction began about Oct. 1 and it is estimated that the project will be completed by about Jan. 1, 1927.

Jardine Mining Co. Pays Small Dividend

The Jardine Mining Co., near Gardiner, Mont., on Oct. 10 paid a dividend of ¼c. per share on its outstanding 2,100,000 shares. An initial dividend of like amount was paid on July 10, this year. The company is now milling 220 tons of ore per day, but is installing equipment to bring capacity up to 300 tons per day. Good progress is being made on the new cyanide plant, which will treat the calcines after arsenic has been extracted. After cyanidation calcines will be tabled to extract scheelite. The property is managed by F. W. and H. C. Bacorn.

Vipond Mill to Be Enlarged

Officials of the Vipond mine announce that the management will proceed at once with additions to the milling capacity, which will bring it up to 300 tons a day. This should give an output of approximately $1,000,000 a year, and with this larger tonnage it is believed that costs can be reduced to approximately $6 a ton. Underground developments at the property continue to be favorable.

Several other new mills are contemplated in the Porcupine district. Machinery for the Ankerite plant is arriving on the ground and it is expected that the mill will be in operation before the end of the coming winter. This property is controlled by the Porcupine Goldfields Development Co., an English organization. The Porcupine Paymaster is building a mill which should be completed shortly after the Ankerite and a little further to the south foundations are being put in for a mill for the March Gold.

In the Larder Lake section the Association Goldfields appears to be going ahead with its mill construction. Concrete foundations are practically all in and a gang of carpenters is now putting up the framework.

In the Sault Ste. Marie district the Goudreau Gold Mines is purchasing heavier grinding equipment, as it has been found that the present small grinding machinery is inadequate.

The main shaft of the Dome mines has recently been carried from the 14th to the 15th level, which is a depth of 1,900 ft. and it may be continued further to the 16th level, or 2,050 ft.

Standard Mines Corporation Plans Mill for Missouri Group in British Columbia

The Standard Mines Corporation, a Tacoma company that is developing the Big Missouri group of claims, situated five miles north of the Premier mine in British Columbia, has opened two new orebodies on the Big Missouri. According to Pat Daly, who is in charge of operations, the company will build a 250-ton mill and a tramway to tidewater during next season.

A large body of low-grade, complex gold ore had been opened by previous syndicates that have had this property under option, but past exploration failed to demonstrate that this ore persisted to an appreciable depth. The exploration of both the new and the old orebodies will be continued through the winter.

Mining Corporation of Canada to Dispose of Flin Flon

The Mining Corporation of Canada is about to dispose of its Flin Flon copper holdings, in The Pas district of Manitoba. Considerable work has been done on the orebody. Flin Flon and optioned properties are carried at $1,516 844 on the company's last balance sheet.

The Flin Flon ores are refractory, carrying copper, zinc, gold, and silver, and a large tonnage is available. Two companies are said to be negotiating for the property.

Hawthorne Mines Build 200-Ton Flotation Plant

CONSTRUCTION work on the new 200-ton flotation plant of the Hawthorne Mines, Inc., at its Lucky Boy mine, near Hawthorne, Nev., is progressing satisfactorily. The concrete work, for retaining walls and machinery foundations, is practically complete, and building construction has been started.

The Lucky Boy mine has been a producer of high-grade lead-silver ore in the past, but has been idle for many years. The present owners plan to mine and mill the ore of milling grade which remains in the mine. The ore will be dropped to the main haulage tunnel, which is over a mile long, and storage-battery locomotives will be used to transport the ore to the milling plant.

Cons. Mining & Smelting Co. Contemplates Custom Smelter at Rouyn

Officials of the Consolidated Mining & Smelting Co. of Canada are discussing the question of building a custom smelter in the new Rouyn, Quebec, copper gold camp. J. J. Warren, president of the Consolidated; S. G. Blaylock, a director and chief metallurgist, General Manager Archibald, and J. Macauley, who has been in the field for both the smelting company and the Canadian Pacific, have just returned from the new camp.

Noranda Smelter Site Selected

The site of the smelter to be erected by the Noranda Mines, Ltd., for the treatment of the gold-copper ores from its properties in the Northwestern Quebec gold field has been definitely settled. Following conferences between representatives of the company and Premier Taschereau of Quebec, it was arranged that the smelter would be built at the mine on Lot 156, Rouyn Township. The work of construction will be started without delay and the plant is expected to be ready for operation next fall.

Tailings at Comet Mill Reworked

Basin operators have obtained a lease on the tailings from the old Comet mill, located in High Ore gulch, about seven miles from Basin, Mont. From 50 to 100 tons per day of these tailings is being shipped to the Timber Butte Milling Co.'s plant, owned by W. A. Clark, where a good recovery of the lead, zinc and silver is being obtained.

Premier Mine Reworks Tailings

The Premier Mining Co., operating in the Joplin-Miami District, is reworking the tailing dump, using the flotation process. There is a sufficient quantity to keep the mill running at least one year. The Tri-State Mining Co. owns a one-half interest in the Premier Mine. The Tri-State 300-ton mill at Cardin, Okla., is nearing completion. (See p. 708.)

Red Lake to Have a Mining Camp

A new mining camp is being established at Red Lake, in the Patricia district of Ontario, where important ore discoveries have been made. Properties staked by Larue Howie and associates, of Haileybury, have been optioned by J. E. Hammell. Surface work is in progress in charge of Alexander Gillies.

The best samples are stated to have yielded $41 over a width of 12 ft. about the middle of the deposit. Arrangements have been made for continuing operations throughout the winter.

The distance from Minaki to Red Lake by canoe and trail is about 150 miles, rendering a continuance of work in the winter impossible, but the Ontario government has placed five aeroplanes at the disposal of Mr. Hammell, which are now engaged in transporting mining equipment and supplies from Minaki to Red Lake.

Kirkland Lake Discovers Ore on 2,000 Level

The Kirkland Lake Gold Mines, of Kirkland Lake, Ont., has made an important discovery on the 2 000 level. The shaft was recently completed to that depth and a crosscut started to pick up the main vein. Where intercepted the values were low, but the crosscut was continued across a total distance of 50 ft. of mineralized material. The discovery was made approximately 400 ft. from the Teck-Hughes boundary line and the indications point to a substantial shoot of ore.

Another new discovery has been made in the Kirkland district on the Kirk Gold Mines. A long crosscut was driven north on the 300 level, and at a distance of 800 ft. from the shaft mineralized quartz stringers have been found over a width of about 10 ft. The discovery is in the immediate vicinity of the porphyry and the few assays taken indicate encouraging results.

European Zinc Buyers Busy in British Columbia

Representatives of European zinc smelters have offered to take the whole of the output of zinc concentrate produced at the Lucky Jim mine, at Zincton, B. C., for the next three years at a rate that is appreciably in advance of that which can be obtained locally. It is understood that in future the Lucky Jim Lead & Zinc Co. will ship its zinc concentrate to Europe and its lead concentrate to Trail.

Canadian-Lorrain Opens Second Ore-Shoot

An official statement on the Canadian-Lorrain property, in South Lorrain, states that the second shoot of ore on No. 17 vein has been developed for a length of 90 ft. It is believed that preparations will be made in the near future to put this property on a producing basis. It is altogether probable that for some time mill ore will be shipped to the Keeley plant, and whether or not a separate mill will be built for the Canadian-Lorrain depends upon developments in the future.

London Letter

By W. A. Doman
Special Correspondent

Avino Mines Financially Embarrassed—Tin Mines Prosperous

London, Oct. 13—When H. F. Marriott's book, "Money and Mines," was published, it created a stir not only on account of the original lines on which it is drawn up, but also for its outspoken criticism of certain classes of management, technical and directorial, and the suggestion that a consulting engineer should be on the board. I am reminded of this by the report of a committee of shareholders on the Avino Mines. The financial position is found to be hopeless, and strong comment is made upon the policy of the directors, whose removal is suggested. No direct charge is made against the consultants at the mine, but inferentially a strong consulting engineer might have changed the course of events. The committee says: "The chairman in his speech at the reconstruction meeting of April 25, 1923, stated that if the sum of £20,000 new cash capital were provided, the board was confident, on the expert advice of its consultants, that the property could be made a dividend payer; but, as we have shown, such a sum was quite inadaquate, and in view of the facts to which we have referred we can only characterize this as an utterly reckless and unfounded statement."

The report is a disclosure of gross mismanagement.

I understand that certain American interests are endeavoring to get a foothold in the copper areas of Rhodesia, where the average grade of the deposits is so much higher than in the older American mines. On a previous occasion I mentioned the abortive negotiations for the acquisition of a block of Union Minière shares in Brussels.

At the moment interest seems to be centering on Bwana M'Kubwa, and the Northern Rhodesia Minerals Concession, in which Edmund Davis and A. Chester Beatty are concerned. Judging by the reports from various parts of Northern Rhodesia, an immense copper belt is being proved; it may be an extension of the Katanga deposit.

With the high price of tin, the project for working the Cornish tin sands is again to the fore. Various attempts have been made to treat them profitably, but without success. Now Dr. A. L. Simon is making a serious experiment for a company called the Burmese Minerals. This company has no connection with Burmah; it acquired a derelict title. That he can extract tin is undoubted, but he will not express an opinion as to the success of his experiment yet. It appears to be the same old question of cost.

The Fabulosa Mines Consolidated (Bolivia) is being taken seriously in hand, a sound group having obtained the control. A company—the Bolivian & General Tin Trust—is being formed to acquire 2,000,001 shares of $1 each out of the authorized capital of $4,000,000. Machinery is to be installed, and according to expressed opinions the property is to turn out a second Aramayo Francke. A. L. Benson, of Robert Benson & Co., and Rose, Van Cutsem & Co. are interested.

The Porcupine Goldfields Development Co. announces the abandonment of the option on the Young-Davidson property, owing to poor developments.

Now that the time is approaching for results to be obtained from the platinum properties in the Transvaal and Rhodesia, holders of the shares are becoming alarmed. The great expectations have yet to materialize, and although relatively few persons in England have put their money into platinum securities, they have been disturbed at what is stated to be almost helter-skelter selling in Johannesburg.

European Iron and Steel Industry Below Normal

According to consular reports to the U. S. Department of Commerce, the unfilled orders on hand at the Spanish iron and steel works continue to decrease as compared with those of last year. The new railway loan of the Spanish Government is giving a more optimistic outlook to the domestic manufacturers of rails and rolling-stock equipment. Iron-ore shipments from Bilbao during September, 1925, amounted to 123,000 metric tons, which is 21,000 tons less than September, 1924.

Unfavorable conditions continue in the Swedish iron and steel industry, and operations are being reduced. Plans are being considered for the consolidation of six or eight iron works which produce primarily for the domestic market. The foreign trade in high-grade steel is excellent. During September, Sweden imported 21,000 metric tons of iron and steel and exported 20,378 tons of iron and steel and 937,000 tons of iron ore, which is considered good.

The German output of pig iron and steel is at present only 65 per cent of normal, with prospects of the activity being further reduced. During the first eight months of 1925 German works turned out 7,224,000 metric tons of pig iron and 8,764,000 tons of steel, which is equivalent to 65 per cent and 61 per cent, respectively, of the production for the corresponding period of 1913. A fusion of four or more large coal and iron concerns of Westphalia is pending. This movement is expected to reduce production costs, to facilitate specialization, and to improve exports.

Black Bear Mining Camp Destroyed by Fire

A recent fire destroyed thirty houses in the little mining settlement of Black Bear, three miles north of Wallace, Idaho. The loss is estimated at between $75,000 and $100,000, and 100 persons were rendered homeless.

The fire for a time threatened the Hecla Mining Co.'s mill at Gem and surface workings of the Black Bear mines and the Cœur d'Alene Syndicate Mining Co.

Johannesburg Letter

By John Watson
Special Correspondent

Gratifying Report of Transvaal Chamber of Mines

Johannesburg, Sept. 8—The following crushing results, for the month of August, from fourteen leading gold-mining companies, have recently been published. The mines are arranged in the order of profits earned.

Government Areas	Tons Crushed	Revenue or Value £	Costs per Ton Milled s.	d.	Estimated Profit £
New Modder	164,000	311,484	16	9.3	176,144
Crown Mines	128,000	274,917	17	6.0	162,905
Modder Deep	215,000	281,460	18	2.7	85,555
Brakpan	44,200	99,590	15	6.0	65,341
Springs	88,000	140,803	18	3.4	60,341
New State Areas	67,600	126,891	20	0.9	59,036
Van Ryn Deep	72,000	126,650	19	10.9	55,284
Geduld	68,000	105,953	16	8.5	50,045
City Deep	81,500	121,065	17	6.0	49,634
Modder B	101,000	157,621	22	5.9	44,052
Randfontein Estate	65,000	103,908	18	11.3	42,360
West Springs	207,000	207,203	16	11.2	35,432
Robinson Deep	47,200	73,169	17	7.9	31,494
	66,500	.....	18	7.4	30,103

The annual report of the Transvaal Chamber of Mines was issued on Sept. 4. The total gold output of the Transvaal since the opening of these fields reached at the end of 1924 a value of £802,832,949 (at the standard price). Last year there was expended in working costs on the Transvaal mines £28,214,509, and the declared estimated working profits totaled £14,650,836, against £12,654,702 in 1923. Dividends declared totaled £9,673,752, against £8,479,845 the previous year. The stores consumed reached a total value of £13,679,813, against £13,316,183 for the previous year. The maximum price realized for the gold produced last year was 97s. 11d. per fine ounce and the minimum 87s. 5d., the average price being 93s. 5.4d. India was the largest purchaser of gold, taking 5,767,579 oz. out of the 10,853,092 oz. sold. New York came next, with a purchase of 3,860,393 oz.

The Robinson Deep, Ltd., has purchased from the Union Government the undermining rights of 181.87 claims on the farm Turffontein No. 19, for £31,436. These claims are situated to the south of the Christopherson shaft and can be exploited from this shaft.

D. Wylie King, mining editor of the *Financial Times* (London), has recently been in Johannesburg and visited the Lydenburg district. His impressions have been published in the *South African Mining Review*. The definite impression with which he left Johannesburg for a brief tour of the Lydenburg platinum area was that so far as the leading companies are concerned an era of genuine development has set in, which promises to make platinum the third of the mining wonders which Africa has given to the world.

Louis Trichardt, correspondent of *The Star*, says that some idea of the mining activity in the Northern Transvaal may be gathered from the fact that within the last four months the total number of claims registered has increased from 30,000 to over 60,000, and the end is not in sight.

Men You Should Know About

H. J. Snyder and his associates are installing a 10-stamp mill at Canada Hill, Placer County, Calif.

G. F. Laughlin, of the U. S. Geological Survey, is in the Cripple Creek district for a six weeks' visit.

Ira B. Joralemon, mining engineer and geologist, has returned to San Francisco from a trip to Mexico on professional business.

Walter Douglas, president of the Phelps Dodge Corporation, is making a general inspection of the Phelps Dodge properties in the West.

Mark Smith, an economist who has been with the Institute of Economics, in Washington, has joined the staff of the U. S. Tariff Commission.

Robert E. Clarke, until recently general purchasing agent for the Utah Copper Company, in Salt Lake, has been transferred to San Francisco.

H. S. Lyon has been appointed petroleum geologist for Venezuela with the Standard Oil Co. and will leave Australia to assume his new duties early in the new year.

J. B. Tyrrell, managing director of the Kirkland Lake gold mine, will on the termination of his agreement with the Anglo-French Syndicate devote his entire time to the management of the Kirkland Lake property.

Prof. W. Frechville and his daughter arrived recently in Johannesburg from London. Professor Frechville is a director of the Anglo-French Exploration Co. Ltd., and was professor of mining at the London School of Mines from 1912-1919.

C. O. Chambers, managing director of the Australian Shale Oil Co., which is operating in the Mersey Valley, Tasmania, has come to the United States to purchase additional plant. The company is operating a ten-ton experimental Bronder retort.

F. C. Druding, of New York, treasurer of the Federal Mining & Smelting Co., recently visited his son, **F. D. Druding,** in Wallace, Idaho, who is connected with the ore-testing laboratory maintained in that city by the American Smelting & Refining Co.

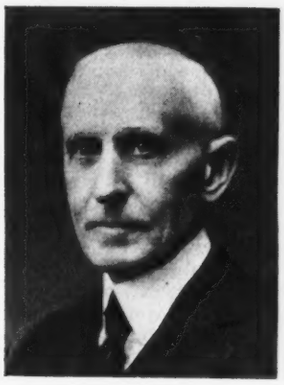
W. L. Uglow, professor of mining and petrology at the University of British Columbia, left Vancouver on Oct. 15 for Hongkong, where he will be engaged for eight months in making a geological survey of the colony for the Government of Hongkong.

Leroy A. Palmer, Robert A. Holley, and **Arthur C. Kinsley,** mineral examiners of the U. S. General Land Office, are engaged in an examination of all lands within the flowage of the proposed Boulder Canyon and Black Canon reservoirs on the Colorado River.

Carl Schaber, lately foreman of the Anita mine, at Lordsburg, N. M., has assumed the superintendency of the newly opened Mamie Richmond mine, at Copper Flat, near Hillsboro, N. M. This mine is credited with a large production of gold in the 80's, but has been long idle.

R. L. Dudley, president, **A. L. Burns,** manager, and **R. E. Connell,** advertising manager, of the Gulf Publishing Co., and **Spencer W. Robinson,** editor of *The Oil Weekly*, a Gulf Publishing Co. magazine, attended the International Petroleum exposition and congress at Tulsa, Okla.

Victor G. Hills, mining engineer of Denver, has been engaged to go to Cyprus as mine engineer for the Cyprus



Victor G. Hills

Mines Corporation, his present address being in care of the company mentioned, at Skouriotissa, Nicosia, Cyprus.

Dr. Edwin T. Hodge, professor of economic geology, University of Oregon, spent the summer making a study of the southern coast line of Oregon and of the rivers which cross the Coast Range, in connection with the investigation dealing with harbor problems of the Oregon coast.

President J. J. Warren, S. G. Blaylock, a director and chief metallurgist, and **General Manager Archibald,** of the Consolidated Mining & Smelting Co. of Canada, have returned from a visit to the Rouyn gold field of Quebec, where the company is understood to be considering the erection of a custom smelter.

R. P. Raynolds, who has been in charge of the Durango plant of the American Smelting & Refining Co. since 1917, will assume a position in the business and financial department of the company at Denver. **R. E. H. Pomeroy,** of Denver, formerly in charge of the Nevada Consolidated smelter, will succeed Mr. Raynolds at Durango.

Norman C. Miller, head of the engineering extension department of the Pennsylvania State College, has resigned to become director of extension at Rutgers University. He has acted as an instructor and head of the department for twelve years, coming here soon after his graduation from the University of Michigan. He expects to assume his new duties about Nov. 15.

G. C. Mackenzie, secretary of the Canadian Institute of Mining and Metallurgy, visited a number of the western branches of the Canadian Institute during October, and on his return east will attend the Annual Western Meeting in Winnipeg from Nov. 3 to 5. During his tour Mr. Mackenzie met the members of the following branches: Rocky Mountain, Rossland, Vancouver City, Vancouver Island, McLeod-Athabasca, Northern Alberta, Manitoba, Porcupine, Cobalt, and Sudbury.

Alford Roos, mining engineer from Vanadium, N. M., has just returned home for a two weeks' absence in the Tierra Blanca district, near Lake Valley, where he executed a commission from private interests to make a geological map and report on an area some two square miles in extent, in which is situated the Bi-Metallic Mining Co. property, the Hornet mine, the Log Cabin, and several other mines. Since the preliminary work of Waldemar Lindgren, many years ago, no further work has been done to work out the stratigraphy and complicated structure of the district. Mr. Roos expects to return later in November and further carry out his investigations there.

Obituary

David Upp Woolsey, who discovered the Le Roi mine, at Rossland, B. C., but did not retain it and made nothing out of it, died at Vancouver on Oct. 16. Mr. Woolsey owned a considerable amount of mining property in the Revelstoke district of British Columbia, and only two weeks before his death negotiated the sale of the Silver Creek group and made financial arrangements for the development of two other properties. He was born at Petrolia, Ontario, in 1865.

Ed Knight, pioneer mining man, mine owner, and mine operator, of Grant County, N. M., died Oct. 12 at the old abandoned mining camp of Georgetown, 7 miles from Santa Rita. Mr. Knight was eighty-five years old. One of the first to arrive at the great silver boom at Georgetown in the early 80's, he had remained there through all the intervening years, owning the best mines of that camp. It is interesting to record that at his death he was the sole surviving American in that now abandoned town, which in its heyday was one of the most populous mining towns in the territory, and remained so until a decimating smallpox epidemic, followed by the collapse of the silver market, swept away the population. Mr. Knight was buried in the long disused cemetery in the forest above Georgetown, according to his expressed wishes. Many of the old-timers who took part in the boom days of Georgetown will recall Ed Knight with kindly feeling, and their fast thinning ranks will be saddened by his passing. Mr. Knight was the last inhabitant of Georgetown, and the old camp, with its deserted mills and streets and store fronts, is now a dead town indeed.

Societies, Addresses, and Reports

Los Angeles Section Honors Women's Auxiliary

South Africa and California's Petroleum Are Subjects Discussed at Meeting—Better Oil Prices Looked For

By T. A. Rickard

ON OCT. 20 the Los Angeles Section of the A.I.M.E. held a meeting, in honor of the Women's Auxiliary, at the Hollywood Country Club. The meeting followed a dinner, at which 110 persons were present. Joseph Jensen, chairman of the section, presided; and the proceedings were opened by a charming and witty speech by Mrs. Frederick B. Close, chairman of the Women's Auxiliary. The present writer then delivered an address upon his recent journey through Central Africa.

Speaker Appealed to the Ladies

At the outset he declared that he he had no intention of describing the mining or metallurgical phases of his observations in Africa, because these would receive adequate treatment in the articles he was contributing to a technical journal that the gentlemen usually read; instead, he proposed to try to interest the ladies by dealing with a non-technical phase of African life, a subject of much wider implication, namely, the spread of civilization into the interior of the Dark Continent —a process in which the miner has played a decisive part.

A few dates summarize the early history of South Africa: The first landing by the Portuguese navigator Bartolomeo Diaz in 1488; the rounding of the Cape of Good Hope by Vasco da Gama in 1497, five years after the discovery of America; the establishment of the first Dutch colony by Jan Van Riebeeck in 1652; the transfer of the colony to England in 1814; the emancipation of the slaves in 1833; and the Great Trek in 1836. The suppression of slavery irritated the Boers, who consisted of Hollanders and French Huguenots, and the payment of compensation was done in such a way as to arouse acute antagonism. Therefore the Boers went forth into the wilderness in their covered wagons with the purpose of establishing communities that would be free from British control and where they would be at liberty to exploit native labor. They held the opinion that the Bible sanctioned slavery and permitted them to use the natives as "the hewers of wood and the drawers of water." They went northward across the Orange River and across the Vaal, where they established the Orange Free State and the Transvaal. Their story had much in common with that of the Mormons. These desired to isolate themselves and to maintain their pet institution of polygamy, which had an economic basis, as a means for promoting an increase of population in their own community. The Boers and the Mormons alike desired to separate themselves from organized authority; they wished to establish isolated communities; they failed, because the advancing tide of civilization overtook them, and overwhelmed them, leaving only the heroic memory of a great adventure.

The speaker proceeded then to contrast the two phases of civilization, the spiritual and the industrial, as expressed by the life-work of two great men of an entirely opposite type: David Livingstone and Cecil John Rhodes. He sketched their lives and referred to the places where he had crossed their trails, such as the memorial to Rhodes at Capetown and his tomb in the Matoppo Hills; likewise the Falls of the Zambesi, discovered by Livingstone in 1855, and Ujiji, where Stanley met Livingstone in 1871. He discussed slavery, and showed that it had an economic basis in a region where the sale of human beings constituted the only medium of trade. Livingstone recognized this fact, and advocated the introduction of legitimate commerce as an economic antidote to the horrors of the slave trade. The miner provided the means for the accomplishment of this purpose.

Finding of Diamonds in 1867

The industrial civilization of South Africa, and of Central Africa also, started when a little child picked up a shining pebble on the banks of the Orange River in 1867. That shining pebble was a diamond worth $2,500. The recognition of the value of the pretty stones in the gravel of the Orange and Vaal rivers started the great mining excitement in 1870, in which, a year later, Cecil Rhodes participated. With the money he made at Kimberley, and later when gold was discovered on the Witwatersrand in 1886, he was enabled to finance his ambitious schemes for the extension of civilization, by means of British rule, into the vast hinterlands of South Africa northward to the sources of the Zambesi and the Congo.

The local section at Los Angeles includes, as might be expected, a large proportion of engineers and geologists connected with the oil industry; therefore one hears a good deal about the production of the liquid mineral, and one has an excellent opportunity to ascertain what is well-informed opinion concerning the future of the oil market, in which, I may add, many members of the profession are interested as a depository for their investments. The annual report of the State Mineralogist just issued shows that in 1924 the value of the petroleum products of the county of Los Angeles, despite a decrease in the volume of output, was $168,420,709, out of a total state mineral production valued at $374,620,789. The output of gold, $13,000,000, although it represented 30 per cent of the total yield of the gold mines in the United States, did not equal in value that of the oranges and lemons produced in the county of Los Angeles. In 1924 the value of the oil products in California as a whole increased by $31,921,565, although the output decreased to the extent of 34,000,000 bbl. On inquiry I find that an optimistic feeling prevails at Los Angeles; that is to say, it is expected that better prices will prevail, next spring, for example, in consequence of a slackening of production.

Competent Geologists Have Helped Oil Companies

During the last two years the proportion of successful prospecting has decreased, so many of the apparently inviting geologic structures having been tested. Ten or twelve years ago the oil companies awoke to the need for employing competent geologists, and when they began to do so the results of exploratory work became remarkably fruitful, as the history of several new oil pools testifies eloquently by the medium of statistics. One of the few important pools to be discovered in California during the last two years is that of Inglewood, where oil was struck at a comparatively shallow depth, namely, 1,300 ft. The deepest oil well in California (and in the world, I believe) is the Miley-Athens No. 6 at Rosecrans, in Los Angeles County. Oil is flowing from this well, which has reached a depth of 7,591 ft. The main point to be noted is that in July last 8,000,000 bbl. of light oil was taken out of storage, this being strong evidence of the tendency toward an end to excessive production. It is anticipated that by December production and imports of oil in the United States will fall below consumption and exports. This condition exists already as regards light oil. The withdrawal of such oil from storage is proceeding so rapidly that the price of oil henceforth is not likely to respond to the lowering of the price of gasoline, such as has been due to an excess of refining. The rate of increase of consumption in the United States, the chief producer and the chief consumer of oil, is now more rapid than the rate of increase of production. Of heavy oils there is still an excessive production in California, but the failure of the Mid-Continental oil fields to expand as rapidly as in the past has served to correct the statistical position.

Mining Conference in New Zealand

A Dominion Mining Conference is to be held at Dunedin, New Zealand, beginning on Feb. 3 next, during the New Zealand and South Seas Exhibition. F. G. Clapp is to contribute a paper on oil geology, with special reference to New Zealand, and James Park is writing one on oil shale and its treatment. There are also to be papers by officials of the Mines Department, together with descriptive papers on various important mines and works. Professor Park is the president and Prof. D. B. Waters the secretary.

Subway and Tube Construction Topics at New York A.I.M.E. Meeting

The New York section of the A.I.M.E. held its regular monthly dinner and meeting at the Machinery Club on Tuesday, Oct. 20. C. M. Weld, the chairman, told the 125 diners present that only 90 of the 1,300 members in the metropolitan district had answered the recent appeal for small contributions to finance the activities of the section. He urged that every one make a contribution.

Robert Ridgway, president of the A.S.C.E., and chief engineer of the New York Transit Commission, talked on "The Construction of New York Rapid Transit Subways." The talk was profusely illustrated throughout, revealing many of the obstacles encountered in construction work. While the city owns the two present subways, they are operated by two independent companies subject to state control. The third subway, now under construction, will be 57 miles long, contain 176 miles of trackage, and cost $506,000,000.

The second address of the evening, on the Holland tunnel, was given by Ole Singstad, chief engineer of the New York-Jersey City vehicular tunnel (Holland tunnel). The illustrations showed this $35,000,000 project in various phases of construction. The length from portal to portal is 8,300 ft. Mr. Singstad dwelt in detail upon the ventilation system, which will supply by means of eighty-four fans 3,600,000 cu.ft. of air per minute at an expense of 6,000 hp.. sufficient to change the air every 1½ min.

The next meeting will be held in the auditorium of the Engineering Societies building, on Nov. 18, on the occasion of an all-day joint safety conference participated in by a number of organizations.

The regular monthly meeting for December will be held on the 15th, the dinner to be at an "uptown" place to be determined later.

Defends Blue-Sky Laws at California Regional Conference

The California Regional Mining Conference, under the auspices of the California Development Association, held a meeting in Stockton, Calif., on Oct. 10, 1925. The meeting adopted resolutions indorsed by the Grass Valley meeting of recent date. F. G. Stevenot defended the blue-sky laws of the state, declaring them to be the best protection mining men and the public ever had. He favored the view that, although gold mining was not at present an inviting field for capital, the gold miner would eventually work out his own problems and the industry would be placed in a more favorable position than it is at present. G. McM. Ross, another speaker and an experienced mining man, said that the miners are discouraged because the government has not seen fit to alleviate their plight with aid. He remarked that mining in California was suffering from inadequate and unskilled labor to a degree hitherto unknown.

Legitimate Functions of a Trade Association

Use or Misuse of Data Is Crux of Question, According to Nathan B. Williams in an Address at St. Louis

In an address by Nathan B. Williams, counsel for the National Association of Manufacturers, delivered at St. Louis recently, the functions of a trade association are outlined. The following is abstracted from his address:

Remembering that the correct rule is that no activity should be undertaken which allows the misuse of otherwise legitimate activities and information; misuse, that is, which would tend to further any agreement or conspiracy to fix prices, limit production, restrict sales, divide territory, or in any manner restrain lawful competition in interstate commerce, the outstanding legitimate activities of trade associations may be catalogued as:

1. Co-operative and combined effort to advance or promote the use of the product manufactured or produced by the members of the association by means of research, publicity, advertisement, and similar activities.

2. To deal with engineering and trade problems for the purpose of advancing the production and use of the product of the members of such association.

3. To promote the welfare of the members of such association, by providing for the arbitration and settlement of trade disputes; the development of trade ethics and codes of fair practices; the study of relations with proper governmental agencies; and the amount and effects of taxation with respect to special industries.

4. To carry on educational work pertinent to the industry, by means of fellowships in schools and colleges, and by other means.

5. To promote and develop the business of its members by experimental and research work, conducted in whatever manner may seem advisable.

6. To hold meetings, prepare, write and publish papers and addresses on the state of and pertaining to the industry.

7. To maintain a traffic bureau for the consideration and presentation of transportation matters before federal and state commissions and to conduct negotiations with common carriers; and to supply information to members concerning the published tariff rates on their product.

8. To develop improved methods of sanitation, safety appliances, working conditions; to engage in accident prevention, the development of better methods of employment, housing conditions, and to promote and provide for the training of apprentices and workmen.

9. To study the problem of insurance, insurance rates, insurance legislation, and, if deemed advisable, to handle the insurance of its members, including fire, casualty, indemnity, or group insurance.

10. To maintain a credit bureau for the purpose of supplying information to members as to the financial standing and credit rating of persons buying or dealing in the product of members.

11. To secure and maintain the standardization of quality, and of technical and scientific terms, including approved accounting practices; the elimination of non-essential types, sizes, styles, or grades of the product of members.

12. To maintain, collect, and distribute timely, unidentified information as to the cost of the product, the price received for it in closed transactions, the volume of production, the stocks on hand, and may meet and discuss such information and statistics without, however, reaching or attempting to reach any agreement on any concerted action with respect to prices or production, or restraining competition.

This latter subject of statistics of production, stocks, and prices has particularly been under attack by the Department of Justice for several years last past. But in the Supreme Court decisions alluded to, the rule of law has now been clearly established that such activity is not unlawful within the limitation outlined, even though the natural tendency of economic law is to bring about, under conditions of full information, a stabilization of price; or in the language of the Supreme Court: "Even though it be assumed that the result of the gathering and reporting of such information tends to bring about uniformity in price."

Contractors Will Confer to Curtail Government "Competition"

As the result of a preliminary conference of representatives of about twenty organizations, held in Washington on Oct. 20, on invitation of the Associated General Contractors of America, a call is to be issued for a meeting of more than 200 trade associations and other business bodies to consider means to eliminate or restrict the activities of government in fields considered properly those of private business. A subcommittee of five, headed by General R. C. Marshall, Jr., general manager of the Associated General Contractors, was appointed with authority to fix the time for the general meeting and to outline a program and a suggested course of action. It is planned to hold the meeting late in November or early in December, just prior to the time when Congress will meet. The session will be held in Washington.

The contractors for several years have been combating the extensive operations of the Army engineers in building public works with their own equipment and the use of day labor, with the opposition extending to similar work by other departments of the Federal Government, and by states, counties, and other political subdivisions. At the recent Dallas meeting of the executive board, the contractors decided to move for restrictive legislation to limit the activities of the Army engineers.

The Editor's Responsibility to the Advertiser

An Address by E. J. Mehren, Vice-President of the McGraw-Hill Co., Before the Annual Convention of the National Industrial Advertisers Association, Atlantic City, Oct. 19, 1925

Mr. President and Gentlemen:

Before answering the question posed in the title of this address, we need to understand the editor's responsibility broadly. It is his job to provide the reading matter. His task is, first, to cover the field adequately so that all information of first importance gets into his pages, and, second, to build up such a reputation for the paper's integrity that the reader will persistently turn to it for information and guidance. That is the sum and substance of the responsibility of the editor. Strictly interpreted, therefore, he has no responsibility to the advertiser. It is with the reader, not the advertiser, that he makes a covenant, when his publisher takes the subscription money, to render comprehensive and disinterested service.

Responsibility to the Manufacturer

But the matter cannot be so simply dismissed. True, stated in all baldness, the editor has no responsibility to the advertiser, as such. He does have, however, a responsibility to the manufacturer. The manufacturer is part of the industry. He supplies the material and tools with which the industry works. He is as much part and parcel of it as the consumer; without him the industry could not exist. What he does for the improvement of materials, machines, processes, and services is vital to the industry, and, therefore, to the executives and workers, who are the readers that the editor serves. It follows, then, that the editor is bound, in order that he may interpret to the reader the developments and progress made in the manufacturing end of the industry, to keep close to the manufacturers and to record the progress they are making.

But that responsibility is to the manufacturers as a whole. The manufacturer who chooses to advertise does not thereby acquire a claim to reading space over and above that of any other manufacturer. This is, to use the Biblical phrase, "an hard saying." It might, moreover, if read by itself, imply that the editor cares little whether people advertise in his paper or not. Such is not the case. The editor, in fact, in taking that position, protects and preserves the very value that you gentlemen buy when you take advertising space. What you buy is the confidence of the reader. The greater his faith in the paper, the greater the value as an advertising medium.

It necessarily follows that if the editor holds a special feeling of obligation to an advertiser because he advertises; if he would print something for the advertiser that he would not print for a non-advertiser who has an equally meritorious proposition, he would violate his covenant of honesty and truth with the subscriber. The bars once let down—the principle thrown to the winds—there is no reason why the editor, on behalf of his advertising department, should not freely trade reading space for advertising patronage.

If, then, editors and publishers jealously refuse to trade their reading pages for advertising orders, it is not because they want to erect artificial standards, or because they are out of sympathy with the efforts of a manufacturer to secure the widest possible dissemination of his story. It is because the very medium that the advertiser values would be destroyed if subserviency of the editor to the advertiser were to prevail.

How the Editor Can Help

All that I have said must in no sense be construed as an indication of any lack of sympathy between the editor and the advertiser. The editor can help the advertiser, can help the manufacturer, should do it, and is glad to do it.

To begin with, the editors are helping you every day in ways that you do not appreciate. The live editor is constantly interpreting to the advertising manager and the advertising salesmen of his paper the conditions in his field, the methods of buying goods, the changing practices and changing demands of consumers, the type of selling appeal that is effective. This information comes to you through the indirect channel of the sales forces of the paper; you do not see, you do not meet the editor—one of the expert counselors of the advertising forces. But the editor is there, giving of the fullness of his knowledge of the field to help you build a sound sales policy and to fit advertising into it intelligently.

The editor can help, too, in pointing out the type of reading matter which should emanate from the manufacturer's organization and which can legitimately be used in the reading pages of his publication. That has been done often by prominent editors in public pronouncements. Frank C. Wight, editor of *Engineering News-Record*, put the matter briefly in an address before the New York Editorial Conference in December, 1924. Said Mr. Wight:

"Only the first time a thing happens is it news. Any new thing is entitled to one editorial presentation. Any contribution to the industry, be it manufacturing device, change of business procedure, change in personnel of his company, new application of some of his equipment—anything which is news is entitled to the editorial space it warrants as news. After that, it is advertising.

"Every day there comes to the editor's desk some descriptive matter of a new device or detail which has already been broadcast in circulars or advertisements until its news value is lost. The advertising man thinks in terms of advertising before he thinks in terms of publicity—but he wants publicity. If he is to get it, he must remember that by its very nature it has prior right over advertising. Every dog, says the old common law, is entitled to one bite. Every novelty is entitled to one bite of free advertising."

This is a sound general statement regarding news from manufacturers. But the editor has a responsibility, as well, of direct co-operation with the individual manufacturer on publicity matter. He should point out to the manufacturer what deficiencies there may be in the material sent to him by the manufacturer. He should indicate just what sort of additional material he needs in order to make a worth-while item—one that will be helpful to the reader. Such handling of matter received from the manufacturer is not merely the responsibility of the editor to a branch of his field; it is the responsibility of plain courtesy as well.

The Advertiser's Responsibility to the Editor

We have been discussing the editor's responsibility to the advertiser. What of the advertiser's responsibility to the editor?

Here, again, the responsibility comes not from the fact that the advertiser is an advertiser, but that he is a manufacturer. Of course, the fact that he is an advertiser indicates that he has already formed a relationship with the publication that should facilitate his contact with the editor, just as this fact should facilitate the relationship which starts from the editor and goes to the advertiser. The responsibility, then, is that of the manufacturer to the editor. And it is just here that the keenness of the advertising man should prove a valuable asset to his organization and to the editor as well.

The advertising man senses news values, the advertising values of developments made by his organization. What more natural, therefore, than that he should want to put news and data about these developments into the hands of the editor as quickly as possible? If the editor has any responsibility to the manufacturer, then the manufacturer, in turn, has this reciprocal responsibility to the editor.

Your attitude toward the editor must be sympathetic, as must the attitude of the editor toward you. He has the responsibility of printing the real news that comes out of your organization. He has the responsibility of pointing out the inadequacy of data that you may send him and of suggesting the additional information he needs for his readers. You, in turn, have the responsibility of seeing that he is promptly supplied with worth-while material, of trying to meet the standards he has set up for the benefit of his readers, and of strenuously supporting him in his insistence upon the maintenance of these standards of editorial service. These standards consistently maintained win reader confidence, and reader confidence is the forerunner and creator of an effective advertising medium. If this sequence—high editorial standards creating reader confidence, and reader confidence creating advertising value—be understood, the unity of interest between editor and advertiser will be appreciated and there will be left no ground for misunderstanding between them.

New Machinery and Inventions

Coupling Shafts That Are Misaligned

Readily Accomplished With New Flexible Device That Is Really a Universal Joint—Made of Special Hard Steel With Standard Ball Bearings

A NEW TYPE of shaft coupling has been put on the market by the Farrel Foundry & Machine Co., Buffalo, N. Y. It is designed to take the place of the usual type of flexible coupling. The makers call it the "Sykes universal shaft coupling," because they claim that it differs from other flexible couplings in being really a universal joint and capable of taking care of small errors in alignment and of connecting shafts which are grossly misaligned. Its limit of angularity is stated to be 5 deg. It will also connect shafts which are offset as much as 4 per cent of the shaft size. For instance, a coupling made for a 4-in. diameter shaft will allow an offset up to as much as 0.16 in.

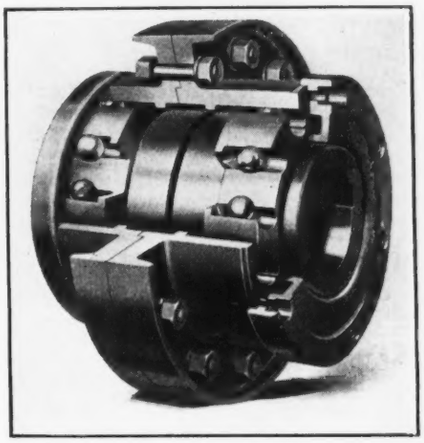
The accompanying illustration shows a coupling with a portion of the outer shell cut away so that its detailed construction is readily understood. It will be seen that the coupling consist mainly of three parts or elements. Two of the elements are in the form of hubs, one adapted to key on the driving shaft and the other on the driven shaft. The third element is made in halves and forms a sleeve, connecting the other two elements. The actual connection, however, is by means of balls bearing in races or grooves formed in lugs. It will be seen from the illustration that one set of lugs is on each of the hub members, and corresponding lugs, inwardly projecting, are on the sleeve member. The sleeve member is made in halves for convenience during installation.

The three diagrammatic figures show the action of the coupling when operating under the three possible conditions of misalignment. It will be seen that the balls can take up a suitable position in their grooves or seating so as to give true, uniform rotation, irrespective of the amount of misalignment. Therefore, the coupling is a true universal joint. It is claimed by the makers that universal action is the only requirement necessary in any so-called flexible coupling.

This new coupling is not designed to give torsional resiliency. It can be made by a slight modification to provide resiliency, but the company does not advocate a coupling embodying this feature.

All parts are made of a hard steel. The balls are standard, hardened steel balls, and have a great resistance to compression.

It may be thought on superficial observation that there is danger of the balls or the ball races wearing rapidly. It should be observed, however, that the balls do not function like balls in a ball bearing. If one of these new couplings is mounted in true alignment, the balls will have no movement. If a coupling is operated under conditions of maximum misalignment, each ball will have a movement of about $\frac{1}{32}$ in. per revolution. Therefore, the velocity under the worst circumstances is very low, and the conditions of operation are more analogous to the ball-bearing crane hook than to a ball journal bearing.

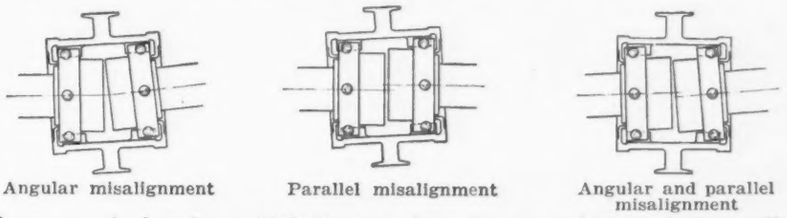


Sectional view of new universal shaft coupling, designed to compensate for misalignment between connecting shafts

The new coupling is at present standardized for shafts from $\frac{3}{4}$ in. diameter up to 8 in. diameter. Larger sizes will be made later. The 8-in. coupling will transmit 1,200 hp. per 100 r.p.m. The makers issue a list giving all dimensions and power-transmitting capacities.

Due to the use of balls as the power-transmitting medium, the question of lubrication is not important. The balls have such a slight movement that a film of grease is ample lubrication. In fact, it is claimed that even if all absence of lubrication should take place the coupling will not undergo serious damage.

A careful analysis of the action of this coupling shows that, irrespective of the amount of swivel of one member relative to the other, the balls have a line contact with their races. That is to say, each race is substantially semi-cylindrical, and each ball always has a full line contact with two races, therefore giving a line contact on the ball over nearly the whole of its circumference. Actually, the races will deform under pressure from the ball and, therefore, give an appreciable load carrying area. The deformation, however, is always well within the elastic limit, so that no permanent deformation ever takes place.



Diagrammatic drawings which illustrate how the new universal shaft coupling compensates for misalignment between connecting shafts

An Improved Drive for Centrifugals

A new type of drive for centrifugal extractors in chemical and other industries has been announced by the General Electric Co., Schenectady, N. Y. This drive, involving the use of a direct-coupled, squirrel-cage motor, offers the advantage of high starting torque with low power consumption and good performance at full speed. The motor used in the new drive, a special form of the General Electric KTR type, is a high torque, squirrel-cage machine with the high-resistance portion of the rotor winding built in the form of a fan and placed at the top of the motor. The heated air developed is thus expelled without passing through the motor proper. With this type of drive the advantages of a direct-coupled, squirrel-cage motor are obtained combined with great flexibility in torque and speed characteristics.

Adjustments are readily made merely by throwing a switch. Power factor and efficiency over the complete cycle of operation are very high because of the use of reduced voltage while running at full speed.

A New Trade Catalog

Rotor Spray — The Hardinge rotor spray has been developed to operate with but small power requirements and to obviate the difficulties encountered with the nozzle type of spray. The degree of atomization can be readily controlled, from coarse drops to a spray so fine and uniform that it resembles a dense mist. The normal capacity of the standard Hardinge rotor spray, which is 12 in. in diameter and 4 ft. long, when direct-connected to a 1-hp. motor, is approximately 150 gal. of water per minute, though much lower capacities, down to 1 gal. per minute, may be handled by lessening the depth of immersion of the rotor and using a smaller rotor, which may be driven by a $\frac{1}{4}$-hp. motor. The spray may be used for air washing and humidifying; for air conditioning for industrial purposes; air and gas scrubbing; gas cooling; cooling liquids; heating liquids; acid absorption and concentration; aëration; washing various products, and mixing and emulsifying. The spray is well described in Bulletin No. 29, just issued by the Hardinge Co., York, Pa.

The Market Report

Metal Prices Advance in Firm Market

Volume of Sales Better Than Last Week—Prompt Lead and Zinc Getting Scarcer

New York, Oct. 28, 1925—The domestic metal market during the week ending today has been most satisfactory, practically all of the more important metals being in increased demand at slightly advancing prices. Perhaps the only unfavorable factor in the situation has been the disturbed political situation abroad, especially the fall of the Caillaux regime in France, which is held to be responsible for liquidation and the pronounced declines in London metal prices today. Unless these declines continue, no corresponding price reductions are expected to occur here, though a somewhat quieter market is noted today.

Most of the Copper Sold at 14⅝c.

Copper prices gradually advanced up to Monday, when practically all of the business was placed at 14⅝c. delivered to near-by points and 14¾c. where the higher freight rates prevail. In fact, some was sold at the higher figure on Monday afternoon for Connecticut delivery, and at 14.70c. yesterday. Monday was clearly the high point, however, both in volume of sales and in prices. Today, the lower prices reported from London have acted as a restraining influence on buyers, and only a small amount of business has been done, chiefly at 14⅝c., delivered, at which several producers would sell. The volume of sales has been better than for several weeks, though one of the large sellers has held aloof from the market, expecting higher prices. Most of the orders have been for December delivery, with a fair sprinkling of January, and an occasional call for November.

The foreign business has been of fair proportions, England particularly taking a little more interest. In the last three days, American agencies have sold at 14.85c., c.i.f.

Zinc Touches 8.65c.

The zinc market has been very active at the higher prices. Spot and November metal is exceedingly scarce, some producers being entirely sold out. As a result, prices have exhibited a wider range than usual, about 15 points, the higher level being the price for November and the lower that for December or January. On both Saturday and Monday, 8.65c., St. Louis, was realized for November shipment. Brass Special grade continues in unusual demand, with premiums of 10 to 25 points being realized, and most producers sold out for delivery within the next few weeks. High-grade for immediate shipment is also almost unobtainable; forward shipment continues at last week's price of 10¼c. The strength in zinc is particularly encouraging, inasmuch as it has not been brought about by export demand. Domestic prices have been so high recently that foreign sales have not been attractive.

Lead Market Stronger

Increased sales at premium prices over the 9.25c. asked by the leading interest in the Middle West have been the feature of the lead market during the week ending today. In fact, this seller has closed some contracts on the basis of ⅓ at 9.25c. and ⅔ at the average price for November. Some uncertainty as to the quantity of November lead that will be available has limited the offerings. In New York the American Smelting & Refining Co. continues to quote 9.50c. per lb. as its official contract price. A good business in addition to regular contract deliveries was done at this figure, particularly since Monday. At least two important sellers have practically no metal avail-

Daily Prices of Metals

Oct.	Copper N. Y. net refinery*	Tin		Lead		Zinc
	Electrolytic	99 Per Cent	Straits	N.Y.	St. L.	St. L.
22	14 30	61.75	63.625	9.50	9.30	8.35@8.50
23	14.375	62.00	64.125	9.50	9.35	8.45@8.60
24	14 375	62.00	64.00	9.50	9.35	8.55@8.65
26	14.45	61.25	63.125	9.50	9.35	8.55@8.65
27	14.375 @ 14.50	61.50	63 50	9.55	9.35	8.50@8 625
28	14.375	61.00	63 00	9.50	9.325	8.40@8.55
Av.	14.385	61.583	63.563	9.508	9.338	8.531

*The prices correspond to the following quotations for copper delivered: Oct. 22d, 14.55c.; 23d and 24th, 14.625c.; 26th, 14.70c.; 27th, 14.625c.@14.75c.; 28th, 14.625c.

The above quotations are our appraisal of the average of the major markets based generally on sales as made and reported by producers and agencies, and represent to the best of our judgment the prevailing values of the metals for deliveries constituting the major markets, reduced to the basis of New York cash, except where St. Louis is the normal basing point, or as otherwise noted. All prices are in cents per pound. Copper is commonly sold "delivered," which means that the seller pays the freight from the refinery to the buyer's destination.

Quotations for copper are for ordinary forms of wire bars, ingot bars and cakes. For ingots an extra of 0.05c. per lb. is charged and there are other extras for other shapes. Cathodes are sold at a discount of 0.125c. per lb.

Quotations for zinc are for ordinary Prime Western brands. Quotations for lead reflect prices obtained for common lead, and do not include grades on which a premium is asked.

The quotations are arrived at by a committee consisting of the market editors of *Mining Journal-Press* and a special representative of the Bureau of Mines and the Bureau of Foreign and Domestic Commerce.

London

Oct.	Copper			Tin		Lead		Zinc	
	Standard		Electrolytic						
	Spot	3M		Spot	3M	Spot	3M	Spot	3M
22	62	62 7/8	67 1/2	283 3/8	283 1/4	39	37 1/4	40 1/2	39 3/16
23	62 5/8	63 1/2	68	285 7/8	285 1/4	39 1/4	37 3/8	40 5/8	39 3/8
26	62 3/8	63 1/4	68	281 1/4	281 3/4	39 7/16	37 1/2	40 1/2	39 1/
27	62 3/8	63 3/8	68	284 7/8	284 1/8	39 1/4	37 7/16	40 9/16	39 3/8
28	62	62 7/8	67 3/4	281	280 3/8	38 1/8	37 1/8	39 3/4	38 7/8

The above table gives the closing quotations on the London Metal Exchange. All prices in pounds sterling per ton of 2,240 lb.

Silver, Gold, and Sterling Exchange

Oct.	Sterling Exchange "Checks"	Silver		Gold London	Oct.	Sterling Exchange "Checks"	Silver		Gold London
		New York	London				New York	London	
22	4.84	71 1/2	33 1/8	84s11½d	26	4.84 5/8	71 3/8	33 1/16	84s10½d
23	4.84	71 1/2	33 1/8	84s11½d	27	4.84 1/2	71 1/8	33	84s10½d
24	4.84 3/8	71 3/8	33 1/8		28	4.84 1/2	71 3/8	33 1/16	84s10½d

New York quotations are as reported by Handy & Harman and are in cents per troy ounce of bar silver, 999 fine. London silver quotations are in pence per troy ounce of sterling silver, 925 fine. Sterling quotations represent the demand market in the forenoon. Cables command three-eighths cent premium.

able for November, and some recent sales have been for December and even as far ahead as January. The sharp decline in the London market for spot today has apparently eased the market somewhat.

Correction: The quotation for three-months lead, London, for Oct. 19, as published in our issue of Oct. 21, was £36½. The correct figure was £36¼.

Tin Still Active

The wide fluctuations in the London tin market were only partly reflected in New York. The break on Monday from 64c. to 63c. stimulated heavy buying by consumers and was followed by improvement during the day to 63½c. We quote 63¼c. as the average market for spot on that date. All positions are about on a parity.

Silver Steady

Silver has continued steady during the last week, with small fluctuations, and the undertone appears somewhat better at the close. The U. S. Government have asked for tenders on Oct. 30 of an additional 500,000 oz. for delivery at the Philadelphia Mint.

Mexican Dollars: Oct. 22d and 23d, 55c; 24th and 26th, 54⅞c.; 27th, 54⅝c.; 28th, 54⅜c.

Continental Exchanges Weak

Francs and lire have been weak owing to the political situation. Closing cable quotations on Tuesday, Oct. 27, were as follows: francs, 4.1725c.; lire, 3.9575c.; and marks, 23.815c. Canadian dollars, $\frac{3}{16}$ per cent premium.

Other Metals

Quotations cover large wholesale lots unless otherwise specified.

Aluminum—99 per cent grade, 29c. per lb.; 98 per cent, 28c. The "trust" increased the price 1c. per pound on Oct. 23. London, 98 per cent, £118@£120 per long ton.

Antimony — Per pound, f.o.b. New York. Chinese brands: spot, 18¼@19¼c.; November, 17½@18¼c.; December, 16¾@18¼c. Very little spot metal is to be had.

Cookson's "C" grade, 20@20¾c.; white oxide, Chinese, 99 per cent, Sb_2O_3, 16½@19½c. Chinese needle, lump, and standard powdered needle, 200 mesh, are nominally unchanged from prices quoted in the issue of Oct. 3.

Bismuth—$2.65@$2.70 per lb., in ton lots. London, 10s.

Cadmium—60c. per lb. London, 1s. 9d. @2s. 2d. Domestic market is firm.

Iridium—$395 per oz. for 98@99 per cent. Market fairly good. London, £80@£85.

Nickel—Ingot, 33@34c.; shot, 34@35c.; electrolytic, 38c.; London, £170@£175 per long ton.

Palladium—$80@$83 per oz. Crude, $65. London, £16, nominal.

Osmium—$115@$120 per ounce.

Platinum—$120 per oz. refined officially quoted. Sales also at $115@$118. Crude, $113.50@$114.50. London, £24 10s.@£25 per oz. for refined; crude £22@£22 10s.

Quicksilver—$85.50@$86 spot; $84.50, forward, per 75-lb. flask. San Francisco, $81.83. London, £14.

Ruthenium—$100@$105 per ounce.

The prices of **Cobalt, Germanium Oxide, Lithium, Magnesium, Molybdenum, Monel Metal, Osmiridium, Radium, Rhodium, Selenium, Tantalum, Tellurium, Thallium, Tungsten** and **Zirconium** are unchanged from the Oct. 3 issue.

Metallic Ores

Manganese Ore—Per long ton unit of Mn, c.i.f. North Atlantic ports: Brazilian, 42@44c., nominal; Indian, 44c., nominal; Caucasian (unwashed), 42c.; Caucasian (washed), 44c. Demand moderate, but price firm.

Tungsten Ore—Per unit of WO_3, N.Y.: Wolframite, $11.50@$12; Western scheelite, $12@$12.50. Market quiet as a consequence of large buying during the last month.

Chrome Ore — Indian ore — second grade—offered c.i.f. New York at $19 per long ton. High-grade Indian ore, $22@$23. Rhodesian ore offered at $23. Prices largely nominal.

Galena and **Pyrite Radio Crystals, Iron Ore, Molybdenum, Tantalum,** and **Vanadium Ores** are unchanged from quotations in the Oct. 3 issue.

Zinc Blende Higher—Lead Ore Stronger

Joplin, Mo., Oct. 24, 1925

Zinc Blende	Per Ton
High	$60.10
Premium, blende, basis 60 per cent zinc	$59.00@$60.00
Prime Western, basis 60 per cent zinc	$58.00
Fines and slimes, basis 60 per cent zinc	$56.00@$52.00
Average settling price, all zinc	$56.34
Lead Ore	
High	$124.41
Basis 80 per cent lead	$120.00
Average settling price, all lead	$119.30

Shipments for the week: Blende, 15,798; lead, 1,873 tons. Value, all ores the week, $1,113,520.

An unverified rumor is to the effect that one lot of lead was sold on $122.50 basis, and another rumor persists that $121 was paid for another lot. The high price indicates a basis higher than $120.

Sellers were offered $58 basis for Prime Western zinc early in the week, and buyers bought freely all week a total of 24,470 tons, 2,330 of which is for export.

Production continues around 16,500 tons per week, and has varied but little this month.

Platteville, Wis., Oct. 24, 1925

Zinc Blende	Per Ton
Blende, basis 60 per cent zinc	$59.50
Lead Ore	
Lead, basis 80 per cent lead	$125.00

Shipments for the week: Blende, 946 tons; lead, 60 tons. Shipments for the year: Blende, 38,639; lead, 1,891 tons. Shipments for the week to separating plants, 1,878 tons blende.

Non-Metallic Minerals

Amblygonite, Andalusite, Asbestos, Barytes, Bauxite, Beryl, Borax, Celestite, Chalk, China Clay, Diatomaceous Earth, Emery, Feldspar, Fluorspar, Fuller's Earth, Garnet, Gilsonite, Graphite, Greensand, Gypsum, Ilmenite, Iron Oxide, Lepidolite, Limestone, Magnesite, Manjak, Mica, Monazite, Ocher, Phosphate, Potash, Pumice, Pyrites, Quartz Rock Crystals, Rutile, Silica, Spodumene, Sulphur, Talc, Tripoli, and **Zircon** are unchanged from prices in the Oct. 3 issue.

Mineral Products

Arsenious Oxide (White arsenic)—3.50c. per lb. Business amounted to several hundred tons. London, £17 per long ton.

Copper Sulphate, Sodium Nitrate, Sodium Sulphate, and **Zinc Oxide** are unchanged from prices in the Oct. 3 issue.

Ferro-Alloys

Ferrotungsten — $1.15 per lb. contained W. Market firm, with tendency toward better price.

Ferrocerium, Ferrochrome, Ferromanganese, Ferromolybdenum, Ferrosilicon, Ferrotitanium, Ferro-uranium and **Ferrovanadium** are unchanged from the prices in the Oct. 3 issue.

Metal Products

Rolled Copper — Sheets. 23c.; wire, 16½c. per lb.

Nickel Silver—29½c. per lb. for 13 per cent nickel Grade A sheets.

Yellow (Muntz) Metal—Sheets, 20⅜c. per lb.; rods, 17⅜c.

Lead Sheets—Rolled, 13½c.; clipped, 13½c.

Zinc Sheets — Advanced Oct. 27 to 11.75c. per lb., f.o.b. works.

Refractories

Chrome Brick, Firebrick, Magnesite Brick, Silica Brick, and **Zirkite** are unchanged from prices in the Oct. 3 issue.

Steel Market Strong—Pig Iron Quiet—Coke Up to $9.50

Pittsburgh, Oct. 27, 1924

Steel market activity continues to maintain a high pace. There is steady buying for current requirements and a moderate amount of buying for stock replenishment. Consumption is running heavy in practically all lines. Buyers' stocks had been reduced to almost nothing, while lately mill deliveries have slowed down slightly in some lines.

Sheet prices as recently advanced are holding well, and a further advance in galvanized sheets is likely to be forced by the high price of zinc. A good-sized tonnage of automobile sheets has already been bought at the advanced price of 4.40c., deliveries extending slightly into the new year.

Pig Iron—The pig iron market is quite dull, consumers preferring to take chances on deliveries after the first of the year rather than pay advances asked predicated on the rise in coke, which may be ended soon. The market is quotable at $19.50@$20.50 for bessemer. $18.50@$19.50 for basic, and $19@$20 for foundry, f.o.b. Valley.

Connellsville Coke—Spot furnace or foundry, $8.50@$9.50.

Company Report

Broken Hill South, Ltd.

Lead, Silver, Zinc; Australia

The report of Broken Hill South, Ltd., for the year ended June 30, 1925, states that operations were carried on under favorable conditions during the year and resulted in the earning of slightly increased profits, compared with the previous twelve months, notwithstanding that owing to cessation of dump slime treatment for lead working account, profit from this source fell away to the extent of £193,328.

The satisfactory result for the period under review was due chiefly to the high price received for lead, which averaged £35 4s. per ton, against £29 10s. 4d. per ton for the previous year. Additional revenue was derived from the increased tonnage of crude ore treated, and larger receipts came from zinc, consequent upon the granular zinc tailings being treated in the company's own plant.

Dividend No. 15, of 1s. 6d., and a bonus of 1s. per share (£100,000) was paid on Aug. 15, 1925.

The general manager estimates that the ore reserves as at present developed amount to 4,000,000 tons.

The average weekly extraction of crude ore was 4,959 tons, compared with 4,606 tons for the previous year. During the month of June an average of 6,110 tons was treated per week.

The alterations to the fine-crushing section of the concentrating mill were completed during the year, and all of the fine grinding is now effected in tube mills with steel balls as the grinding medium.

The fire which has been burning in the Central mine since July 10, 1923, has decreased materially during the last year, and all evidence now available indicates that any active fire areas remaining must be small.

As a result of conferences between representatives of the union and the companies, an agreement has been entered into governing wages and conditions of work for three years as from Jan. 1, 1925. The arrangement provides for a bonus payment while the price of lead is above £30 per ton and an adjustment of the wage rate if the cost of living index number for Broken Hill rises above 1,546.

Working Account for the Year Ended June 30, 1925

	£	s.	d.	£	s.	d.
To mine expenditure						
Extraction and treatment of crude ore and mine development				563,939	16	8
Treatment of slimes from old dumps				57,289	7	7
Gross profit derived from						
Production prior to July 1, 1924	66,654	9	6			
Crude ore, year to June 30, 1925	6,419,610	10	1			
Dump slime, year to June 30, 1925	34,001	16	9			
				520,266	16	4
				1,141,496	0	7
By realizations derived from production prior to July 1, 1924						
Crude ore	59,250	15	0			
Dump slime	7,403	14	6			
				66,654	9	6
Production from crude ore, year ended June 30, 1925				983,550	6	9
Production from old slime dumps, year ended June 30, 1925				91,291	4	4
				1,141,496	0	7

Balance Sheet As at June 30, 1925

Liabilities

	£	s.	d.	£	s.	d.
Capital, 800,000 shares of £1 each, (paid up otherwise than in money)				800,000	0	0
Debentures—6 per cent						
Issue of 2,000 debentures of £100 each	200,000	0	0			
Less 1,265 debentures received	126,500	0	0			
				73,500	0	0
Special reserve (not available for dividends)				278,639	9	6
General reserve				156,473	7	1
Debenture sinking fund				135,678	9	5
Depreciation reserve				313,918	0	0
Workmen's compensation fund				15,836	10	0
Provision for income taxes				74,834	15	1
Provision for royalty				15,145	2	0
Appropriation for new plant and mine development				101,671	8	1
Sundry creditors				71,067	12	4
Balance appropriation account				291,553	14	4
				2,328,318	7	10

Assets

	£	s.	d.	£	s.	d.
Mine account				84,487	6	10
Plant account—						
Valuation July 1, 1918 (less fire loss £70,000)	425,000	0	0			
Additions to June 30, 1925 (at cost)	407,997	11	8			
				832,997	11	8
Shares in other companies (at cost)						
B. H. Associated Smelters Pty., Ltd., 200,000 of £1	200,000	0	0			
Electrolytic Zinc Co. of Australasia, Ltd., 150,000 of £1	150,000	0	0			
British Australian Lead Manufacturers Pty., Ltd., 20,000 of £1	20,000	0	0			
Miscellaneous	22,870	0	0			
				392,870	0	0
British Australian Lead Manufacturers Pty., Ltd., 7½ per cent debentures (at cost)				26,000	0	0
Commonwealth loans (at cost)				10,172	2	6
Supplies and stores (at valuation)				118,012	3	10
Metals unrealized and on hand				350,144	14	10
Sundry quick assets				513,634	8	2
				2,328,318	7	10

Only Slight Changes in October Dividend List

The following dividends were paid by mining and metallurgical companies, operating in the Americas, in October, 1925:

Companies in the United States	Situation	Per Share	Total
Cresson Consolidated Gold	Colo.	$0.10 Q	$122,000
Eagle-Picher Lead, pfd., l,z	Okla., Mo.	1.50 Q	12,984
Gladstone Mountain, l	Wash.	0.005 M	6,609
Homestake Mining, g	S. D.	0.50 M	125,580
Inland Steel, pfd	Minn.	1.75 Q	175,000
Inspiration Cons. Copper	Ariz.	0.50 Q	590,983
Kennecott Copper	Alaska	0.75 Q	3,350,437
Magma Copper	Ariz.	0.75 Q	306,116
Newmont Mining, h	Various	0.60 I	258,000
Nichols Copper, pfd	N. Y.	1.75 Q	40,434
Park-Utah Consolidated, s,l,z	Utah	0.15 I	300,000
Phelps Dodge, c	U. S. and Mex.	1.00 Q	500,000
Republic Iron & Steel, pfd	Various	1.75 Q	437,500
Silver King Coalition, s,l	Utah	0.25 Q	304,025
Sloss-Sheffield Steel & Iron, pfd	Ala.	1.75 Q	117,250
Tonopah Belmont Development, s,g	Nev.	0.05 SA	75,000
Tonopah Mining, s,g	Nev.	0.75 SA	75,000
U. S. Smelting, Ref. & Mining	Various	0.75 Q	263,336
U. S. Smelting, Ref. & Mining, pfd	Various	0.875 Q	425,556
Utah Apex, l,c,s,g	Utah	0.35 Q	184,870
Companies in Other Countries			
Ahumada Lead, l,s	Chihuahua	0.25 Q	296,754
Asbestos Corporation	Quebec	1.50	45,000
Asbestos Corporation, pfd	Quebec	1.50 Q	60,000
Dome Mines, g	Ont	0.50 Q	500,000
Erupcion, l,s	Chihuahua	0.15 Q	187,500
Hollinger Consolidated Gold	Ont.	0.08 4 wks.	393,600
Howe Sound, c,l,s	B. C.	0.50	198,415
Kerr Lake, s,g	Ont.	0.125 SA	75,000
Lucky Tiger-Combination, g,s	Sonora	0.07	92,993
New York & Honduras Rosario, g,s	Honduras	0.50 Q	100,000
Nipissing, s	Ont.	0.15 Q	180,000
Premier Gold, s,g	B. C.	0.08 Q	400,000
Silversmith, s,l,z	B. C.	0.01 Q	25,000
Wright-Hargreaves, g	Ont.	0.05 Q	137,500
			$10,362,442

c, copper; l, lead; z, zinc; g, gold; s, silver; h, holding company; Q, quarterly; M, monthly; I, initial; SA, semi-annually.

Dividends for October are slightly less than for the corresponding previous quarter, in spite of a rather increased prosperity now being enjoyed by the mining industries. The slight decline is occasioned by the fact that more semiannual dividends were paid in July than in October. Newmont Mining paid its initial dividend, of 60c. a share, this month. This company obtains its dividends from shareholdings in other mining companies, among which are Kennecott and Texas Gulf Sulphur, together with Pacific Oil, Chile Copper, Continental Oil, and Anglo-American Corporation of South Africa. It is interesting to note that the shares of this company have recently been quoted about $5.50 below the value of the shares which it holds.

Park-Utah Consolidated pays its first dividend after consolidation. In Canada, the Asbestos Corporation again pays a dividend on its common stock, the first since last February, when it paid $2. Erupcion paid only 15c., instead of 25c. for the previous quarter, in spite of high lead and silver prices. This may have had something to do with the recent decline in Ahumada stock, Ahumada being its sister property.

Note—Companies paying dividends that are not being reported by *Mining Journal-Press* are invited to send in a statement regularly, giving the desired information.

Current Prices of Mine Materials and Supplies

Rise and Fall of the Market

Comparing current prices of mine materials and supplies with those in effect one month ago, it is found that the principal advances occurred in black steel sheets; c.-i. pipe; pine and hemlock timbers; air, water and steam hose; belting; and rope. The important declines were in galvanized sheets; railroad spikes; hollow tile; wire nails; cement; lime; and linseed oil. There are probably more declines than advances in the present market for general commodities.

SHEETS—Quotations are per 100 lb. in various cities from warehouse also the base quotations from mill:

Blue Annealed	Pittsburgh, Large Mill Lots	St. Louis	Chicago	San Francisco	New York
No. 10	$2.25@2.30	$3.60	$3.50	$3.70	$3.80
Black					
No. 28	4.20	4.50	4.00	4.65	4.35
Galvanized					
No. 28	3.05@3.15	5.50	5.00	5.75	5.35

STEEL RAILS—The following quotations are per ton f.o.b. Pittsburgh and Chicago for carload or larger lots:

	Pittsburgh Current	Pittsburgh One Year Ago	Birmingham	Chicago
Standard bessemer rails	$43.00	$43.00	$43.00	$43.00
Standard openhearth rails	43.00	43.00	43.00	43.00

TRACK SUPPLIES—The following prices are base per 100 lb. f.o.b. Pittsburgh for carload lots, together with the warehouse prices at the places named:

	Pittsburgh Current	Pittsburgh One Year Ago	Chicago	St. Louis	San Francisco	Birmingham
Standard spikes, ⅝-in. and larger	$2.70@2.80	$2.80	$3.55	$3.65	$4.35	$2.90
Track bolts	3.90@4.15	3.75@4.00	4.55	3.25	5.85	3.90
Standard section angle bars	2.75	2.75	3.30	3.25@3.75	4.00	3.85

STRUCTURAL MATERIAL—Following are base prices f.o.b. mill, Pittsburgh and Birmingham together with quotations per 100 lb. from warehouses at places named:

	Pittsburgh, Mill	Birmingham Mill	New York	Dallas	St. Louis	Chicago	San Francisco
Beams, 3 to 15 in.	$1.90@2.00	$2.05	$3.34	$4.00	$3.25	$3.10	$3.30
Channel, 3 to 15 in.	1.90@2.00	2.10	3.34	4.00	3.25	3.10	3.30
Angles, 3 to 6 in., ¼ in. thick	1.90@2.00	2.10	3.34	4.00	3.25	3.10	3.30
Tees, 3 in. and larger	1.90@2.00	2.10	3.34	4.00	3.35	3.10	3.30
Plates	1.80@1.90	2.00	3.34	4.00	3.25	3.10	3.30

WIRE ROPE—Discounts from list price, f.o.b. New York and east of Missouri River, on regular grades of bright and galvanized are as follows:

Cast steel round strand rope	20%
Galvanized steel rigging and guy rope	7½%
Round strand iron and iron tiller	5%
Plow steel round strand rope	35%
Special steel round strand rope	30%
Galvanized iron rigging and guy rope	+12½%

	New York	Cleveland	Chicago
Drill Rod (from list)	60%	55%	60%

WROUGHT PIPE—The following discounts are to jobbers for carload lots at Pittsburgh mill:

	Steel Inches	Steel Black	Steel Galv.	Iron Inches	Iron Black	Iron Galv.
BUTT WELD	⅛ to 3	62	50½	⅛ to 1½	30	13
LAP WELD	2½ to 6	59	47½	3 to 6	28	13

STEEL PIPE—From warehouses at the places named the following discounts hold for steel pipe:

	Black New York	Black Chicago	Black St. Louis
3½ to 6 in. lap welded	48%	51%	46%

CAST-IRON PIPE—The following are prices per net ton for carload lots:

	New York Current	New York One Year Ago	Birmingham	Chicago	St. Louis	San Francisco
6 in. and over	$50.60@51.60	$56.60@57.60	$41.00 @ 42.00 base	$49.20@50.20	$48.00	$54.00

NUTS—Semi-finished, ½x¾-in., 2c. each. Discount 70% for ⅝-in. and smaller; 65% for ¾-in. and larger. Case hardened, 6c. each, less 50%.

HOLLOW TILE—Price per block in carload lots to contractor for hollow building tile.

	New York Current on Trucks	New York One Year Ago	Chicago	Philadelphia	St. Louis	San Francisco	Perth Amboy N. J., Factory
4x12x12	$0.1027	$0.1162	$0.075	$0.12	$0.07	$0.108	.....
6x12x12	.1541	.1743	.096	.....	.095	.156	$0.252*
8x12x12	.1926	.2179	.135	.22	.132	.244	.312†

* 10x12x12; † 12x12x12.

MACHINE BOLTS—½x1½-in., per 100, $1.70. Discount at New York warehouses on all sizes up to 1x30-in., 40%.

LUMBER—Prices of rough Douglas Fir No. 1 common, in carload lots to dealers at yards in San Francisco. To contractors, $2 per M. ft. additional.

	6-8 and 12 Ft.	10-16-18 and 20 Ft.	22 and 24 Ft.	25 to 32 Ft.
3x3 and 4	$26.00	$27.00	$28.00	$31.00
3x6 and 8	26.00	27.00	28.00	31.00
4x4-6 and 8	26.00	27.00	28.00	31.00

Wholesale prices to dealers of long leaf yellow pine. To contractors in New York City, delivered from lighters or cars to job, $5 additional.

	New York 20 Ft and Under	New York 22-24 Ft.	Chicago 20 Ft. and Under	Chicago 22-24 Ft.
3x4 to 8x8	$48.00	$49.00	$41.50	$42.50
3x10 to 10x10	52.00	53.00	45.50	46.50
3x12 to 12x12	56.00	57.00	53.50	54.50‡

Other Cities	8 x8-In. x 20 Ft. and Under Pine	Fir*	Hemlock	Spruce	12 x 12-In. 20 Ft. and Under Pine	Fir*
Boston	$51.00	$48.00†	$51.00	$50.00	$60.00	$58.00†
Cincinnati	37.00	73.00	73.00	85.00	48.00	77.00
Denver	.....	32.25	32.25	.....	.....	33.75
Minneapolis	43.00	36.75	35.00	.....	44.50	36.75
Kansas City, Mo.	43.50	41.75	.....	.....	53.50	42.75
Philadelphia	56.00	34.00	37.00	40.00	67.00	34.00

*Douglas fir. † Prime. ‡ 4x12 to 12x12.

NAILS—The following quotations are per keg from warehouse:

	Pittsburgh, Mill	Chicago	San Francisco	Dallas	St. Louis	Montreal
Wire	$2.65	$3.15	$3.40	$4.20	$2.90	$4.95
Cut	2.90	.....	5.00	5.00	3.30	5.00

PORTLAND CEMENT—Prices to contractors per bbl. in carload lots *without bags*. Cash discount not deducted.

	Current	One Month Ago	One Year Ago
NewYork, del. by truck	$2.50@2.60	$2.50@2.60	$2.50@2.60
Chicago, f.o.b.	2.10	2.20	2.20
Cleveland, f.o.b.	2.29	2.39	2.39

LIME—Warehouse prices:

	Hydrated, per Ton Finishing	Hydrated, per Ton Common	Lump, per Barrel Finishing	280-lb. net Common
New York	$18.20	$12.@13.10	$3.50	$2.25@$2.75
Chicago	20.00	18.00	1.45 (180-lb. net)	1.30

LINSEED OIL—These prices are per gallon:

	New York Current	New York One Year Ago	Chicago Current	Chicago One Year Ago
Raw in barrel (5 bbl. lots)	$1.00½	$1.03	$1.01	$1.05

WHITE AND RED LEAD—In 100-lb. kegs, base price in cents per pound:

	Dry Current	Dry 1 Yr. Ago	In Oil Current	In Oil 1 Yr. Ago
Red	15.75	14.75	17.25	16.25
White	15.75	14.75	15.75	14.75

HOSE—Quotations at New York warehouses:

Fire Protection 50-Ft. Lengths

Underwriters' 2½-in. coupled, single jacket ..... 71c per ft.

Air—Best Grade

¾-in., per ft. ..... 3 ply $0.37½ 4 ply $0.46

Steam—Discounts from List

First grade ..... 30–10% Second grade ..... 40% Third grade ... 40–10%

RUBBER BELTING—List price 6-in., 6 ply, $1.83 per lin.ft. for rubber transmission belting.

Best grade ..... 50% Second grade 50–10%

LEATHER BELTING—List price, 24c. per lin.ft. per inch of width for single ply at New York warehouses:

Grade	Discount from list
Medium	40%
Heavy	30–10%

RAWHIDE LACING—For cut, best grade, 50%, 2nd grade, 60%. For laces in sides, best, 41c. per sq.ft.; 2nd, 37c. Semi-tanned: cut, 50%; sides, 41c. per sq.ft.

PACKING—Prices per pound:

Rubber and duck for low-pressure steam, ½ in.	$0.90
Rubber sheet	.45
Rubber sheet, wire insertion	.70

MANILA ROPE—Per lb., ¾-in. and larger, 1,200-ft. coils.

Atlanta	$0.34	New Orleans	$0.24½
New York	.27	Seattle	.24
Chicago	.24	San Francisco	.24

EXPLOSIVES—Prices per pound of dynamite in small lots:

	Gelatin 40%	Gelatin 60%
New York	$0.27	$0.295
Minneapolis	.1917	.2123
Denver	.2025	.2275
Seattle	.165	.19
Cincinnati	.22	.245
New Orleans	.233	.26
San Francisco	.1625	.1925

FLOTATION OIL—

Pine tar, 50 gal. bbl., gross weight 500 lb., f.o.b. New York, carload lots, per gal.	$0.37

CHEMICALS—

Zinc dust, 550 lb. casks, f.o.b. works, per lb.	$0.10½
Litharge, f.o.b. New York, kegs, per 100 lb.	15.75
Sodium cyanide, 220 lb. single case lots, f.o.b. works, per lb.	18@.22
Calcium carbide, in drums, f.o.b. works, per lb.	.05½

Mining Stocks—Week Ended October 24, 1925

Stock	Exch.	High	Low	Last	Last Div.
COPPER					
Anaconda	New York	47⅞	43⅜	46¼	Oc.17,No.23,Q 0.75
Arcadian Consol.	Boston	1	*¾5	*¾9	
Ariz. Com'l	Boston	13⅛	12	13⅛	Jy.21, Jy. 31 SA 0.50
Calaveras	N. Y. Curb	2⅞	2⅛	2⅛	
Calumet & Arizona	New York	55⅛	51½	54½	Se.4, Se.21 Q 1.00
Calumet & Hecla	Boston	15	14⅛	14⅛	Au.31, Se.15 Q 0.50
Canario Copper	N. Y. Curb	8	5	5	
Cerro de Pasco	New York	62½	55⅛	61	Oc.22, Nov.2 Q 1.00
Chile Copper	New York	35⅝	33⅛	35⅜	Se.4, Se.28, Q 0.62½
Chino	New York	23⅛	22	22⅝	Sept., 1920 0.37½
Con. Coppermines	N. Y. Curb	2⅞	2⅛	2⅛	
Copper Range	Boston	21⅛	19⅛	21	Ap.9, My.4 1.00
Crystal Copper	Boston Curb	*37	*32	*34	
East Butte	Boston	4⅜	4⅛	4⅛	Dec., 1919 0.50
First National	Boston Curb	*15	*15	*15	Feb., 1919 0.15
Franklin	Boston	1	*80	*80	
Granby Consol.	New York	20⅛	18⅞	20⅜	May, 1919 1.25
Greene-Cananea	New York	13⅜	12½	13	Nov., 1920 0.50
Hancock	Boston	*70	*70	*70	
HoweSound.new,r.t.c.	New York	29⅝	27	28⅜	Oc.5, Oc. 15 Q 0.50
Inspiration Consl.	New York	28⅛	26⅛	28	Se.17, Oc.5, Q* 0.50
Iron Cap	Boston Curb	2⅞	2⅜	2⅜	May, 1923 0.15
Isle Royal	Boston	13⅜	11⅞	13⅛	Sept., 1923 0.50
Jerome Verde Dev.	N. Y. Curb	*70	*50	*70	
Kennecott	New York	58	55⅜	57⅜	Se.11, Oct.1 Q 0.75
Lake Copper	Boston	1⅜	1⅛	1⅛	Jn.1, Jn.15 Q 0.50
Magma Copper	New York	44⅞	41	44	Oct.1, Oct.15, 0.75
Mason Valley	N. Y. Curb	2⅛	2	2⅛	
Mass Consolidated	Boston	*75	*75	*75	Nov., 1917 1.00
Miami Copper	New York	9⅞	9⅛	9⅛	No.2, No.16 Q 0.25
Mohawk	Boston	35	32	34⅞	Oc.31, De.2 1.00
Mother Lode Coa.	New York	7⅜	7⅛	7⅜	Jn. 12, Jn. 30 0.37½
Nevada Consol.	New York	14⅛	14⅛	14⅜	Sept., 1920 0.25
New Cornelia	Boston	20⅞	19⅛	19⅝	No.6, No.23 Q 0.25
North Butte	Boston	2⅛	1⅞	2	Oct., 1918 0.25
Ohio Copper	N. Y. Curb	*97	*85	*88	No. 14, De. 2 0.05
Old Dominion	Boston	20⅛	19⅛	20⅛	Dec., 1918 1.00
Phelps Dodge	Open Mar.	†139	†137		Se.19, Oc.2 Q 1.00
Quincy	Boston	25⅞	23⅛	25⅞	Mar., 1920 1.00
Ray Consolidated	New York	14⅝	13⅜	14⅛	Dec., 1920 0.25
Ray Hercules	N. Y. Curb			14	
St. Mary's Min. Ld.	Boston	36⅛	34	36	Ap.20, My.20, 3.00
Shannon	Boston	*65	*55	*65	Nov., 1917 0.25
Shattuck Arizona	New York	6⅛	6⅛	6⅛	Jan., 1920 0.25
Superior & Boston	Boston	1⅛	1⅛	1⅛	
Tenn. C. & C.	New York	12⅞	12⅜	12⅜	De.31, Ja.15,Q 0.25
United Verde Ex.	N. Y. Curb	26⅛	25⅛	26⅛	Oc. 6, Nov. 20 0.75
Utah Copper	New York	101¼	100	101⅞	Se. 18, Se. 30, Q 1.00
Utah Metal & T.	Boston	*70	*55	*70	Dec., 1917 0.30
Victoria	Boston	*55	*40	*55	
Walker Mining	Salt Lake	1.97½	1.70	1.90	
NICKEL-COPPER					
Internat. Nickel	New York	38	35⅛	37	Se.11, Se.30, Q 0.50
Internat. Nickel, pfd.	New York	101	100⅜	100⅜	Oc.15, No.2, Q 1.50
LEAD					
Gladstone M. M. Co.	Spokane	*24	*23½	*24	No. 1, No. 10 M 0.01
National Lead	New York	163⅞	158½	163	N.20, De.15 Q 1.75
National Lead pfd.	New York	117	116¼	117	Aug.21, Se.15 1.75
St. Joseph Lead	New York	43⅞	43	43½	Nov.10,De.21Q 1.05
ZINC					
Am. Z. L. & S.	New York	9⅝	9	9⅜	May., 1920 1.00
Am. Z. L. & S, pfd.	New York	35¼	32⅛	34	Nov., 1920 1.50
Butte C. & Z.	New York	7⅜	6	7	De.10, De.24 0.50
Butte & Superior	New York	12⅞	11½	12	Se.18, Se.30 0.50
Callahan Zn-Ld	New York	2	1⅞	2	Dec., 1920 0.50
New Jersey Zn.	N. Y. Curb	...	...	203	Jn.20,Jy.10 Ex. 2.00
United Zinc	N. Y. Curb	...	...	*20	
Yellow Pine	Los Angeles	*70	*64½	*64½	Se.10 Se.21 Q 0.04
GOLD					
Alaska Juneau	New York	2⅛	2	2⅛	
Argonaut	Toronto	*19¼	*18½	*19	
Barry-Hollinger	Toronto	*27	*24¼	*26	
Carson Hill	Boston	*60	*35	*60	
Consol. W. Dome L.	Toronto	*12½	*10⅜	*12	
Cresson Consol. G.	N. Y. Curb	2⅝	2⅜	2⅜	Se.30, Oc.10 0.10
Crown Reserve	Toronto	*16½	*16	*16¼	Jan., 1917 0.05
Dome Mines	New York	14⅜	14⅜	14½	Se.30, Oc.20, Q 0.50
Golden Cycle	Colo. Springs	...	...	1.51	Dec. 11, 1924 0.03
Hollinger Consol.	Toronto	17.10	15.90	17.00	Oc.19, Nov.4 0.08
Homestake Mining	New York	49½	49	49	Oc.20, Oc.26 M 0.50
Kirkland Lake	Toronto	*51	*33	*49	
Lake Shore	Toronto	7.85	7.73	7.76	Se.1, Se.15 0.05
McIntyre-Porcupine	New York	19⅜	19⅛	19⅜	No.2, De.1 Q 0.25
Newray	Toronto	*22½	*21½	*22	
Night Hawk Pen.	Toronto	*12	*10½	*11	
Portland	Colo. Springs	...	...	*43	Oct., 1920 0.01
Rand Mines	New York			36½	Au.17, Au.25 1.52
Teck-Hughes	Toronto	1.93	1.91	1.91	
Tom Reed	Los Angeles	*50	*50	*50	Dec., 1919 0.02
Tough-Oakes	Toronto	*55	*49½	*54	
United Eastern	N. Y. Curb	*50	*50	*50	July, 1924 0.05
Vipond Cons.	Toronto	1.15	1.08	1.14	
Wright-Hargreaves	Toronto	6.43	6.35	6.41	Se.15, Oc.1 QEx 0.05
GOLD AND SILVER					
Black Oak	N. Y. Curb	...	...	*81	
Carnegie Metals	Pittsburgh	17⅛	16½	17⅝	
Con. Cortez	N. Y. Curb	*8	*8	*8	
Con. Virginia	San Francisco	6⅜	5⅛	6⅛	
Continental Mines	N. Y. Curb	...	...	75	
Dolores Esperanza	N. Y. Curb	*60	*52	*57	July, 1923 0.05
Premier Gold	N. Y. Curb	2 5/16	2⅛	2¼	Se.18, Oc.3 0.08
Tonopah Belmont	N. Y. Curb	*71	*70	*70	Se.15, Oc.1 0.05
Tonopah Divide	N. Y. Curb	...	...	*23	Oct., 1923 0.10
Tonopah Extension	N. Y. Curb	1⅜	1 7/16	1⅜	Mh.11, Ap.1, Q 0.05
Tonopah Mining	N. Y. Curb	4⅛	4	4	Se.30, Oc.21 0.07½
Unity Gold	N. Y. Curb	...	...	*50	
West End Consol.	N. Y. Curb	...	...	*30	Mar., 1923 0.05
Yukon Gold	N. Y. Curb	*32	*32	*32	June, 1918 0.02

Stock	Exch.	High	Low	Last	Last Div.
SILVER					
Alvarado	Boston Curb	...	...	*75	Oct., 1920 0.50
Beaver Consol	Toronto	*39¼	*27½	*33¾	May. 1920 0.03
Castle-Trethewey	Toronto	1.44	1.42	1.43	
Coniagas	Toronto	1.75	1.50	1.70	May, 1924 0.12½
Keeley	Toronto	1.50	1.43	1.49	Au.31,Se.15RX 0.12
Kerr Lake	N. Y. Curb	1⅛	1⅛	1⅛	Oc. 1, Oc.15 Q 0.12½
La Rose	Toronto	*41	*39	*40	Apr., 1922 0.10½
Lorrain Trout Lake	Toronto	*80	*80	*80	Jy. 2, Jy. 15 0.05
McKinley-Dar.-Sav.	Toronto	*17	*14	*16	Oct., 1920 0.03
Mining Corp. Can.	Toronto	2.95	2.93	2.94	Jy.1, Jy.15 0.12½
Nipissing	N. Y. Curb	5¼	4⅞	4⅞	Se.30, Oc.20, Q 0.15
Ontario Silver	New York	10⅜	9⅜	10	Jan., 1919 0.50
Temiskaming	Toronto	*12	*12	*12	Jan., 1920 0.40
SILVER-LEAD					
Ahumada	New York	9⅛	8⅜	8⅜	Se.19,Oc.2,QEx. 0.25
Bingham Mines	Boston	60¼	53⅜	59⅞	Se.19, Se.30 Q 0.50
Cardiff M. & M.	Salt Lake	*51	*49	*51	De.16, No.18 0.10
Chief Consol.	Salt Lake	3.50	3.45	3.45	Oc. 10, No. 1 0.10
Columbus Rexall	Salt Lake	1.25	1.00	1.25	Aug., 1923 0.05
Erupcion	Boston Curb	2⅜	2 5/16	2⅜	Se.19,Oc.2,QEx. 0.15
Federal M. & S.	New York	32¾	28	32¾	Fe.26, Mh.15 Q 1.75
Federal M. & S., pfd.	New York	75¾	71⅛	75¾	Au.25, Se.15 1.75
Hecla Mining	N. Y. Curb	17⅝	17⅛	17⅛	Au.15, Se.15 Q 0.50
Iron Blossom Con.	Salt Lake	...	...	*39	Oc.25, 1924 0.01½
Iron King Mining	Salt Lake	*55	*45	*46	
Keystone Mining	Salt Lake	*70	*69	*70	Au.12, Au.26 0.07½
Lucky Jim	Spokane	12⅜	12	12¼	
Mammoth Mining	Salt Lake	3.10	3.02½	3.10	My.15, My.25 0.10
March Mines	Spokane	*9⅞	*9¼	*9⅞	Se.15, Oc.1 0.15
Park Utah	Salt Lake	8.15	7.50	7.60	Se.15, Oc.1 0.15
Prince Consol.	Salt Lake	*5¼	*3¾	*4¼	
Silver King Coal.	Salt Lake	9.50	9.50	9.75	Se.23,Oc.1, Q 0.25
Silversmith	Spokane	*30¼	*28	*30¼	Oc.1, Oc.10 0.01
Tamarack-Custer	Spokane	*36	*33	*35	Sept., 1924 0.25
Tintic Standard	Salt Lake	14.00	14.00	14.00	Se.22, Se.29 0.40
Utah-Apex	Boston	6⅞	6 23/32	6⅞	Oc.3, Oc.15, Q 0.35
Western Utah Copper	N. Y. Curb	...	...	*10	
IRON					
Bethlehem Steel	New York	47⅛	41⅝	47⅛	July, 1924 1.25
Colorado Fuel & Iron	New York	41⅞	38⅛	41⅛	May, 1921 0.75
Gt. North'n Iron Ore	New York	31⅜	30⅜	32	Ap.11, Ap.30 1.00
Inland Steel	New York	45⅛	41⅛	45	Au.14, Se.1, Q 0.62½
Mesabi Iron	N. Y. Curb	1⅞	1⅜	1⅞	
Replogle Steel	New York	16¼	14⅛	16⅜	
Republic I. & S.	New York	56	50⅜	55	May, 1921 1.50
Republic I. & S. pfd.	New York	94	92¼	93⅛	Se.15, Oc.1, Q 1.75
Sloss-Sheffield S. & I.	New York	115	102	111⅝	Se.10, Se.21 Q 1.50
Sloss-Shef. S.&I. pfd.	New York	99⅜	98	99⅜	Se.21, Oc.1, Q 1.75
U. S. Steel	New York	130	124⅛	129⅞	Au.29,Au.31,QEx 1.75
U. S. Steel pfd.	New York	126¼	125	125⅛	Au.3, Au.29, Q 1.75
Virginia I. C. & C.	New York	...	...	30¼	Jan., 1924 1.50
Virginia I.C.&C.pfd	New York	...	...	70	Jn.20, Jy.2, 2.50
VANADIUM					
Vanadium Corp.	New York	32⅞	30	32⅞	No.2, No.16 Q 0.50
ASBESTOS					
Asbestos Corp.	Montreal	97½	90	96½	Se.30, Oc.15 Q 1.50
Asbestos Corp., pfd.	Montreal	113¼	110¼	113¼	Se.30, Oc.15, Q 1.50
SULPHUR					
Freeport Texas	New York	23½	20⅜	22½	Nov., 1919 1.00
Texas Gulf	New York	119½	113⅛	117½	Au.31, Se.15, Q 2.00
DIAMONDS					
De Beers Consol.	New York	25	25	25	Jy.27, Au.30 0.97
PLATINUM					
So. Am. Gold & P.	N. Y. Curb	6⅜	3¼	4⅜	
MINING, SMELTING, REFINING AND GENERAL					
Amer. Metal	New York	55⅜	50⅜	54⅜	Au.20, Se.1, Q 0.75
Amer. Metal pfd.	New York	116	116	116	Au. 21, Se.1, Q 1.75
Amer. Sm. & Ref.	New York	116⅜	109	116	Oc.16, No.2, Q 1.75
Amer. Sm.&Ref.pfd.	New York	114¼	113½	114½	No.6, De.1, Q 1.75
Consol. M. & S.	Montreal	165½	146	160¼	Jn.30, Jy.15 0.75
Federated Metals	N. Y. Curb	26	26	26	
Newmont Mining	N. Y. Curb	44½	43¾	44½	Oc.1, Oc.15 0.60
Southwest Metals	N. Y. Curb	...	...	1	
U. S. Sm. R. & M.	New York	46	43½	45¾	Oc.7, Oc.15, Q 0.75
U.S. Sm. R.&M.pfd.	New York	47	46¾	46¾	Oc.7, Oc.15, Q 0.87½

* Cents per share. † Bid or asked. Q, Quarterly. SA, Semi-annually. M, Monthly. K, Irregular. I, Initial. X, Includes extra. The first date given is that of the closing of the books; the second that of the payment of the dividend.

Boston quotations courtesy Boston Stock Exchange; Toronto quotations those of the Standard Stock Exchange of Toronto, by courtesy of Arthur E. Moysey & Co.; Spokane, Pohlman Investment Co.; Salt Lake, Stock and Mining Exchange and George H. Watson & Co.; Colorado Springs, Colorado Springs Stock Exchange.

LONDON QUOTATIONS, WEEK ENDED OCT. 17, 1925

	High	Low	Last	Date	Per Cent
Aramayo Mines (2s fcs.)	88/9	80/—	85/—	Aug. 1925	5(c)
British Platinum	9/3	8/1½	9/—	Feb. 1925	2½
Burma Corpn. (10 rupees)	19/—	17/—	18/10½	Aug. 1925	6 annas.
Bwana M'Kubwa	7/1½	6/6	6/10½		
Camp Bird	4/3	3/6	3/9		
El Oro	6/1½	5/6	5/9	Nov. 1924	2½*
Esperanza	1/—	—/9	—/10½		
Frontino & Bolivia	9/—	8/9	9/—	July 1925	3¾
Mexican Corporation	15/4½	14/7½	15/3		
Mexican Mines of El Oro	46/3	42/6	42/6	June 1925	10*
Nechi (pref. 10s.)	1/3	1/—	1/—	1921-22	25
Oroville Dredging	4/—	3/7½	4/—	Dec. 1923	3¾
Ouro Preto	4/4½	4/—	4/3	May 1925	2½
St. John del Rey	14/4½	13/7½	14/—	June 1925	6¼
San Francisco Mines	27/—	26/3	26/9	June 1925	15
Santa Gertrudis	15/1½	13/4½	14/—	July 1920	5
Selukwe (2s. 6d.)	11/—	10/1½	10/3	April 1917	6⅜
S. American Copper	6/6	5/9	6/—	Nov. 1917	75
Tanganyika	48/—	44/6	46/10½	Sept. 1925	5
Tomboy	3/9	3/3	3/6	Sept. 1925	5
Union Minière du Haut-Katanga (Brussels) 100 Fr.	6.790	6.360	6.790	July 1925	150(b)

* Free of British income tax. (b) Belgian francs. (c) Swiss francs.